AD-A131 699 INSTALLATION RESTORATION PROGRAM RECORDS SEARCH FOR MOUNTAIN HOME AIR FORCE BASE IDAHO(U) CH2M HILL GAINESVILLE FL JUL 83 F08637-80-G-0010 1/3

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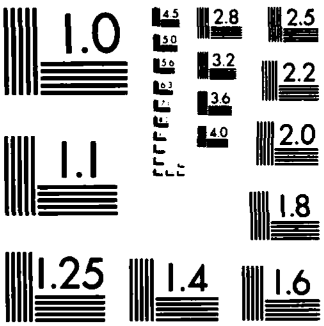

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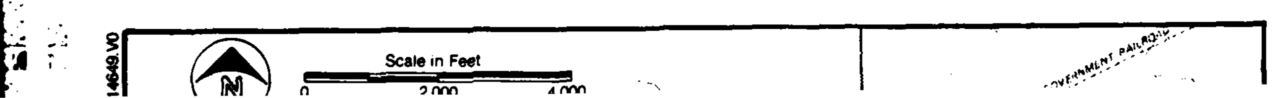

INSTALLATION RESTORATION
PROGRAM RECORDS SEARCH

FOR

MOUNTAIN HOME AIR FORCE BASE, IDAHO

Prepared for

366TH TACTICAL FIGHTER WING
MOUNTAIN HOME AIR FORCE BASE, IDAHO

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July 1983

Contract No. F08637-80-G0010-0017

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EXECUTIVE SUMMARY

A. INTRODUCTION

1. CH2M HILL was retained on December 20, 1982, to conduct the Mountain Home Air Force Base (AFB) records search under Contract No. F08637-80-G0010-0017, with funds provided by Tactical Air Command (TAC).

2. Department of Defense (DoD) policy, directed by Defense Environmental Quality Program Policy Memorandum (DEQPPM) 81-5, is to identify and fully evaluate suspected problems associated with past hazardous material disposal sites on DoD facilities, control the migration of hazardous contamination from such facilities, and control hazards to health and welfare that may have resulted from these past operations.

3. To implement the DoD policy, a four-phase Installation Restoration Program has been directed. Phase I, the records search, is the identification of potential problems. Phase II (not part of this contract) consists of follow-on field work to determine the extent and magnitude of contaminant migration. Phase III (not part of this contract) consists of technology base development (evaluation of alternatives for remedial actions) to support the development of project plans for controlling migration or restoring the installation. Phase IV (not part of this contract) includes those efforts which are required to control identified hazardous conditions.

4. The Mountain Home AFB records search included a detailed review of pertinent installation records, contacts with 10 government organizations for

documents relevant to the records search effort, and an onsite base visit conducted by CH2M HILL during the week of March 14 through March 18, 1983. Activities conducted during the onsite base visit included interviews with 42 past and present base employees, ground tours of base facilities, a detailed search of installation records, and a helicopter overflight to identify past disposal areas. The installations addressed in the records search include Mountain Home AFB, Saylor Creek Electronic Warfare Range, Strike Dam Recreation Annex, and the Small Arms Range Annex.

B. MAJOR FINDINGS

1. The majority of industrial operations at Mountain Home AFB have been in existence since the early 1940s. The base was deactivated after World War II, reopened from 1948 to 1950, again deactivated in 1950, and again reopened in 1951. Industrial operations were not conducted and therefore related wastes were not generated during periods of deactivation. The major industrial operations include propulsion, pneudraulic, corrosion control, and aerospace ground equipment (AGE) shops and the non-destructive inspection (NDI) lab. Industrial operations have generated varying quantities of waste oils, fuels, solvents, and cleaners. The total quantity of these wastes ranged from 20,000 to 40,000 gallons per year.

2. The standard procedures for the final disposition of the majority of the waste oils, fuels, and solvents have been: fire department training exercises, road oiling, and landfills (1943-1945, 1948-1950, 1951-1961); fire department training

exercises, central collection and contractor removal, and road oiling (1961-1969); and segregati n, central collection, and contractor removal through the DPDO (1969 to present).

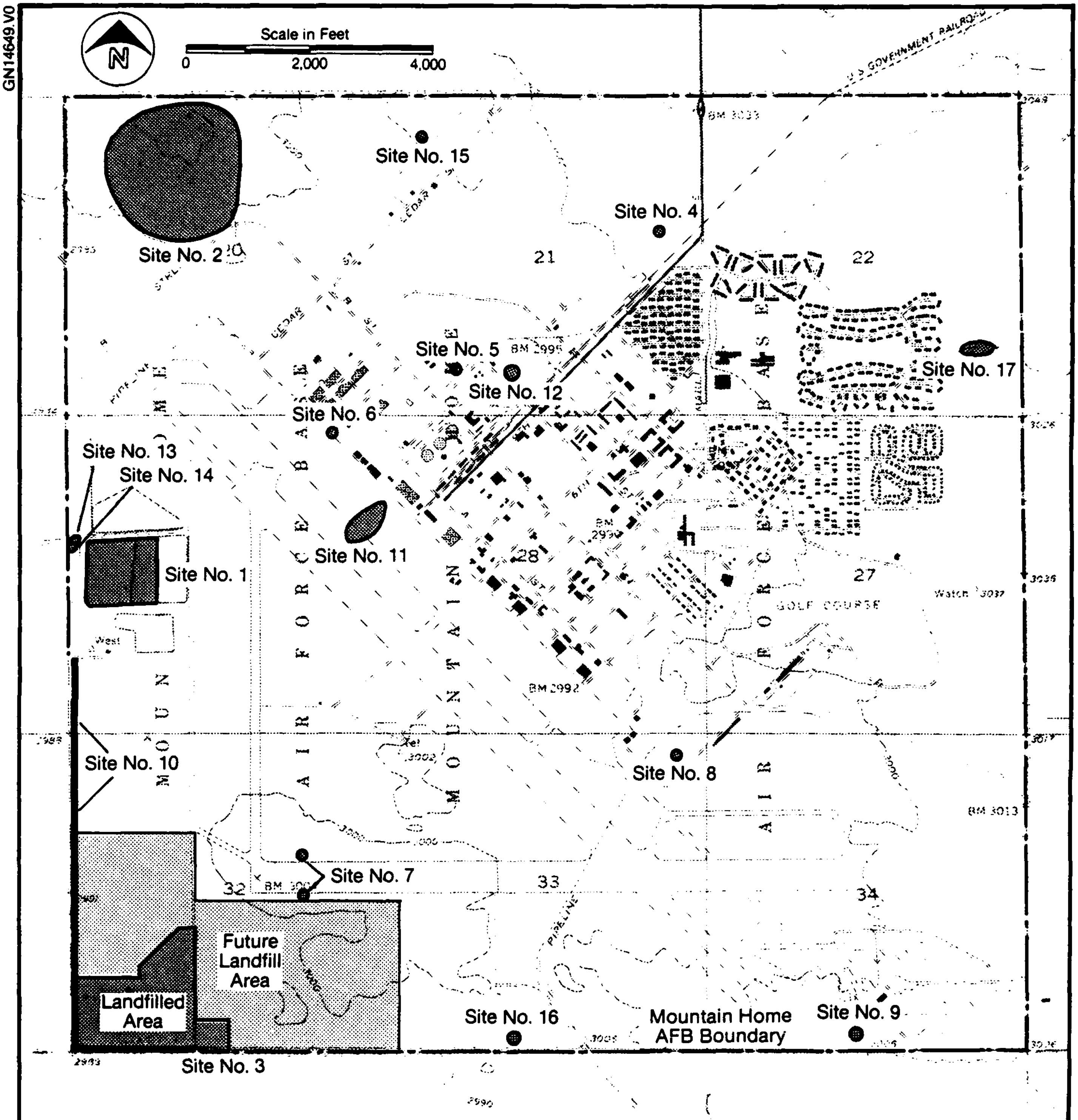
3. Interviews with past and present base employees resulted in the identification of 17 past disposal or spill sites at Mountain Home AFB and the approximate dates that these sites were active (see Figure 1, page 4, for site locations).

4. Interviews with past and present base employees resulted in the identification of 4 munitions residue burial sites at Saylor Creek Electronic Warfare Range. No disposal or spill sites were identified at Strike Dam Recreation Annex or the Small Arms Range Annex.

C. CONCLUSIONS

1. No direct evidence was found to indicate that migration of hazardous contaminants exists within or beyond Mountain Home AFB boundaries. Analyses of base potable water supply wells show that these wells meet primary drinking water standards for pesticides and heavy metals. Elevated nitrate nitrogen levels in Well No. 3 are not related to past hazardous waste disposal practices. The elevated nitrate nitrogen in this well is believed to be caused by fertilizer application to the adjacent golf course which may have migrated into the well through a faulty casing.

2. No evidence of environmental stress resulting from past disposal of hazardous wastes was observed at Mountain Home AFB.



LEGEND

Site No. 1—Lagoon Landfill
Site No. 2—B Street Landfill
Site No. 3—Existing Landfill
Site No. 4—Fire Dept. Training Area No. 1
Site No. 5—Fire Dept. Training Area No. 2
Site No. 6—Fire Dept. Training Area No. 3
Site No. 7—Fire Dept. Training Area No. 4
Site No. 8—Existing Fire Dept. Training Area
Site No. 9—Waste Oil Disposal Site
Site No. 10—Perimeter Road
Site No. 11—Fuel Hydrant System Leak/Spill Area
Site No. 12—Entomology Shop Yard
Site No. 13—Low-Level Radioactive Material Burial Site
Site No. 14—Corker Material Burial Site
Site No. 15—Munitions Residue Burial Site
Site No. 16—Used Tire Disposal Site
Site No. 17—Old Burial Trench

FIGURE 1.
Location Map of Identified Disposal and Spill Sites at Mountain Home AFB, Idaho.

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3. Information obtained through interviews with 42 past and present base personnel, base records, shop folders, and field observations indicates that hazardous wastes have been disposed of on Mountain Home AFB property in the past.

4. The potential for migration of hazardous contaminants is low because of the absence of a driving force. The lack of a driving force is a result of the low ground-water table, negative annual net precipitation, and the low permeability of the soil cemented layers within the soil horizon. In areas where the soil layer has been breached by excavating and a driving force exists, e.g., regular irrigation or ponds, the potential for vertical migration of contaminants is much greater because of the permeability of the underlying basalt. If a driving force exists, then horizontal movement of contaminants above low-permeability strata with migration into wells through faulty casings is another potential pathway for ground-water contamination.

5. Table 1 presents a priority listing of the rated sites and their overall scores. The following sites were designated as areas showing the most significant potential (relative to other Mountain Home AFB sites) for environmental impact.

   a. Lagoon Landfill (Site No. 1)
   b. B Street Landfill (Site No. 2)
   c. Existing Fire Department Training Area (Site No. 8)

Table 1
PRIORITY LISTING OF DISPOSAL SITES

Site No.	Site Description	Overall Score
1	Lagoon Landfill	70
11	Fuel Hydrant System Leak/Spill Area	58
2	B Street Landfill	57
8	Existing Fire Department Training Area	54
12	Entomology Shop Yard	52
10	Perimeter Road	48
9	Waste Oil Disposal Site	48
4	Fire Department Training Area No. 1	47
5	Fire Department Training Area No. 2	47
7	Fire Department Training Area No. 4	47
6	Fire Department Training Area No. 3	45
3	Existing Landfill	40

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d. Fuel Hydrant System Leak/Spill Area (Site No. 11)

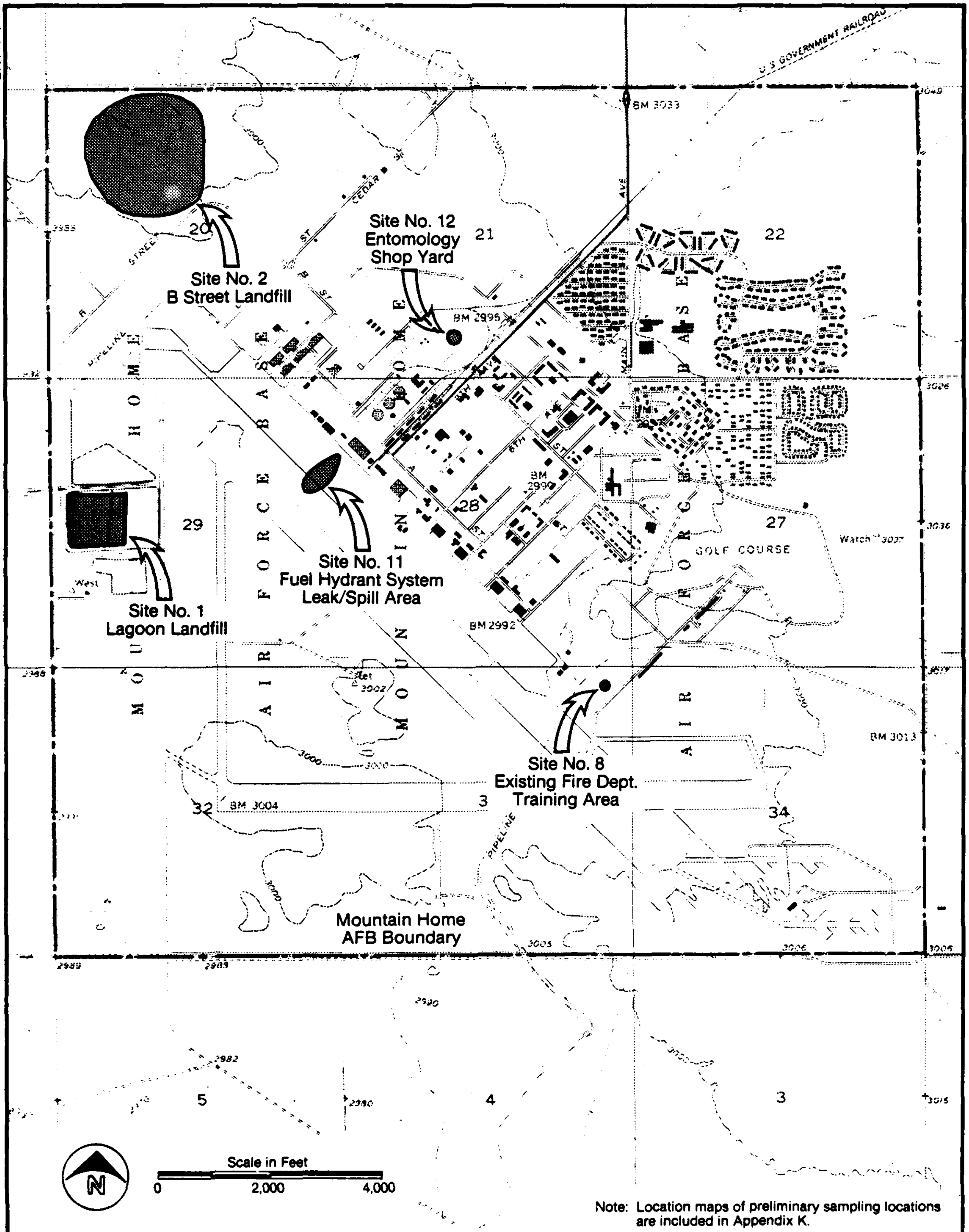
e. Entomology Shop Yard (Site No. 12)

6. The remaining rated sites (Sites No. 3, 4, 5, 6, 7, 9, and 10) as well as the sites that were not rated are not considered to present significant environmental concerns; therefore, no Phase II work is recommended.

7. The records search did not indicate any significant environmental concerns for Saylor Creek Electronic Warfare Range, Strike Dam Recreation Annex, and the Small Arms Range Annex. Therefore, no Phase II work is recommended for these off-base installations.

D. RECOMMENDATIONS

1. A limited Phase II monitoring program is recommended for Sites No. 1, 2, 8, 11, and 12 to confirm or rule out the presence and/or migration of hazardous contaminants (see Figure 2, page 8 for locations of the above sites). This program includes the installation of monitoring wells for sampling the ground water downgradient of the Lagoon Landfill and the B Street Landfill; soil sampling at the Existing Fire Department Training Area, the Fuel Hydrant System Leak/Spill Area, and the Entomology Shop Yard; surface water sampling at the Lagoon Landfill and the Entomology Shop Yard; and bottom sediment sampling at the Lagoon Landfill. Details of the limited Phase II monitoring program are provided in Section VI and in Appendix K of this report.



Note: Location maps of preliminary sampling locations are included in Appendix K.

FIGURE 2.
Location Map of Sites Recommended for Limited Phase II Monitoring.

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2. No imminent hazard has been determined. The priority for monitoring at Mountain Home AFB is considered low to moderate.

3. The final details of the monitoring program, including the exact locations of sampling points, should be finalized as part of the Phase II program. In the event that contaminants at levels of serious concern are detected, a more extensive field survey program should be implemented to determine the extent of contaminant migration.

4. Other environmental recommendations were made in addition to the Phase II monitoring and include a survey of inactive POL storage tanks to determine their status, a leak testing program for active underground waste POL storage tanks, and the addition of a volatile organic compound (VOC) scan or a total organic halogen (TOX) scan to the comprehensive sampling and analyses of base potable water supply wells.

5. Recommendations as to appropriate land use restrictions pertaining to identified disposal sites are also included in Section VI of this report.

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I. INTRODUCTION

A. BACKGROUND

The United States Air Force, due to its primary mission, has long been engaged in a wide variety of operations dealing with toxic and hazardous materials. Federal, state, and local governments have developed strict regulations to require that disposers identify the locations and contents of disposal sites and take action to eliminate the hazards in an environmentally responsible manner. The primary Federal legislation governing disposal of hazardous waste is the Resource Conservation and Recovery Act (RCRA) of 1976, as amended. Under Sections 6003 and 3012 of the Act, Federal agencies are directed to assist the Environmental Protection Agency (EPA) and state agencies to inventory past disposal sites and make the information available to the requesting agencies.

To assure compliance with these hazardous waste regulations, the Department of Defense (DoD) developed the Installation Restoration Program (IRP). The current DoD IRP policy is contained in Defense Environmental Quality Program Policy Memorandum (DEQPPM) 81-5, dated 11 December 1981 and implemented by Air Force message dated 21 January 1982. DEQPPM 81-5 reissued and amplified all previous directives and memoranda on the Installation Restoration Program. DoD policy is to identify and fully evaluate suspected problems associated with past hazardous contamination, and to control hazards to health and welfare that resulted from these past operations. The IRP will be the basis for remedial actions on Air Force installations under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, and clarified by Executive Order 12316.

To conduct the IRP Hazardous Materials Disposal Sites Records Search for Mountain Home AFB, Idaho, CH2M HILL was retained on December 13, 1982 under Contract No. F08637-80-G0010-0017 with funds provided by Tactical Air Command (TAC). The installations included in the records search include: (1) Mountain Home AFB; (2) Saylor Creek Electronic Warfare Range; (3) Small Arms Range Annex; and (4) Strike Dam Recreation Annex. All of the above installations are near Mountain Home, Idaho. A location map of these sites is shown on Figure 3 (page I-3).

The records search is Phase I of the DoD Installation Restoration Program and is intended to review installation records to identify possible hazardous waste-contaminated sites and to assess the potential for contaminant migration. Phase II (not part of this contract) consists of follow-on field work as determined from Phase I. Phase II consists of a preliminary survey to confirm or rule out the presence and/or migration of contaminants and if necessary, additional field work to determine the extent and magnitude of the contaminant migration. Phase III (not part of this contract) consists of technology base development (evaluation of alternatives for remedial actions) to support the development of project plans for controlling migration or restoring the installation. Phase IV (not part of this contract) includes those efforts which are required to control identified hazardous environmental conditions.

B. AUTHORITY

The identification of hazardous waste disposal sites at Air Force installations was directed by Defense Environmental Quality Program Policy Memorandum 81-5 (DEQPPM 81-5) dated 11 December 1981, and implemented by Air Force message dated 21 January 1982, as a positive action to ensure

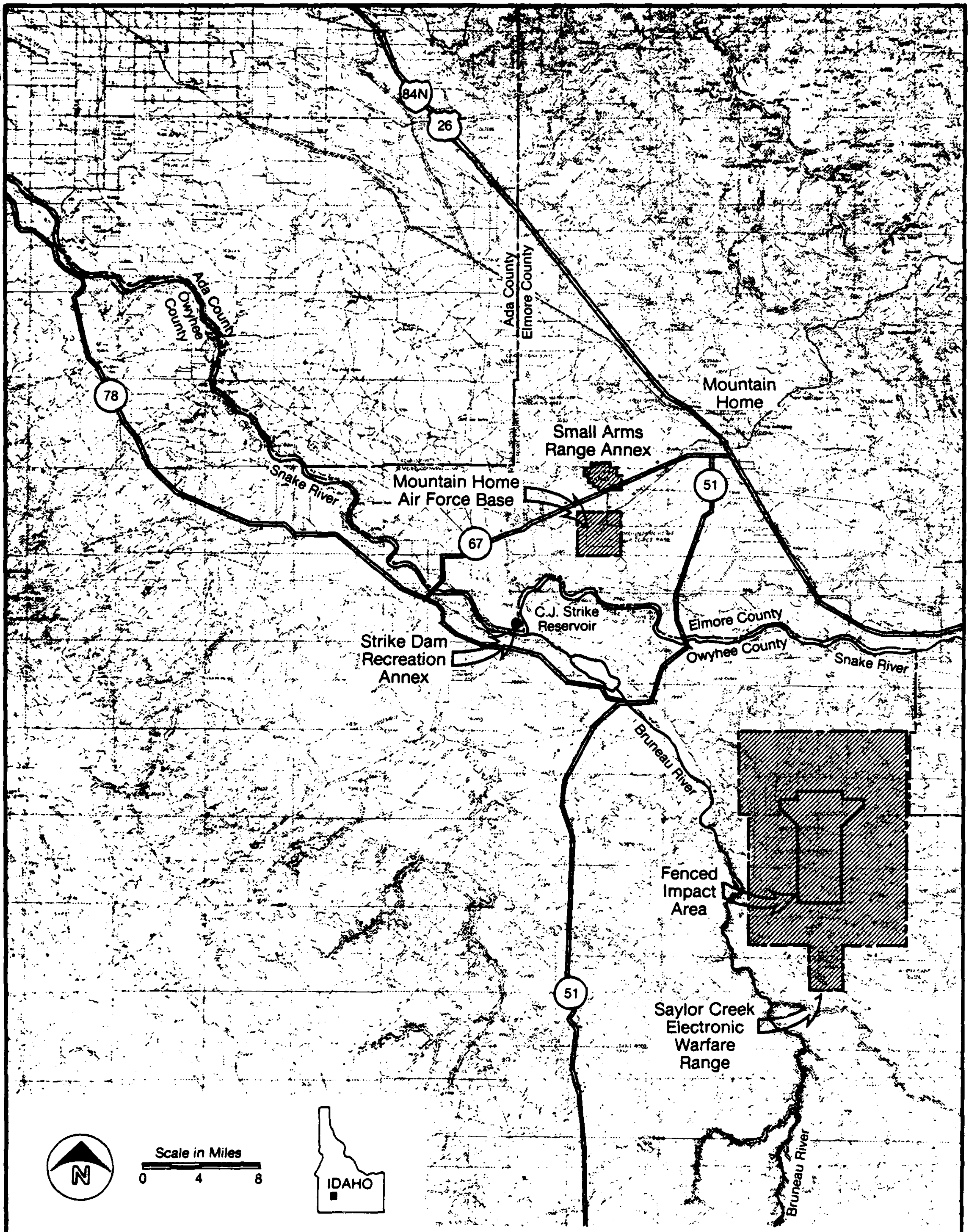

FIGURE 3.
Locations of Mountain Home AFB, Small Arms Range Annex, Strike Dam Recreation Annex, and Saylor Creek Electronic Warfare Range.

compliance of Air Force installations with existing environmental regulations.

C. PURPOSE OF THE RECORDS SEARCH

The purpose of the Phase I records search is to identify and fully evaluate suspected problems associated with past hazardous material disposal sites and spill sites on DoD facilities. The existence and potential for migration of hazardous material contaminants were evaluated at Mountain Home AFB by reviewing the existing information and conducting an analysis of installation records. Pertinent information included the history of operations, the geological and hydrogeological conditions which may have contributed to the migration of contaminants, and the ecological settings which indicated environmentally sensitive habitats or evidence of environmental stress.

D. SCOPE

The records search program included a pre-performance meeting, an onsite base visit, a review and analysis of the information obtained, and preparation of this report.

The pre-performance meeting was held at Mountain Home AFB, Idaho, on February 2, 1983. Attendees at this meeting included representatives of the Air Force Engineering and Services Center (AFESC), Tactical Air Command (TAC), Mountain Home AFB, and CH2M HILL. The purpose of the pre-performance meeting was to provide detailed project instructions, to provide clarification and technical guidance by AFESC, and to define the responsibilities of all parties participating in the Mountain Home AFB records search.

The onsite base visit was conducted by CH2M HILL from March 14 through 18, 1983. Activities performed during the

onsite visit included a detailed search of installation records, ground and aerial tours of the installation, and interviews with past and present base personnel. At the conclusion of the onsite base visit, the Combat Support Group Commander was briefed on the preliminary findings. The following individuals comprised the CH2M HILL records search team:

1. Mr. Norm Hatch, Project Manager (M.S. Chemistry, 1972; M.S. Environmental Engineering, 1973)

2. Mr. Tom Ridgik, Assistant Project Manager (M.S. Environmental Engineering, 1981)

3. Mr. Gary Eichler, Hydrogeologist (M.S. Engineering Geology, 1974)

4. Mr. Chuck Blair, Ecologist (M.S. Ecology, 1978)

Resumes of these team members are included in Appendix A. Government organizations were contacted for information and relevant documents. Appendix B lists the organizations contacted.

Individuals from the Air Force who assisted in the Mountain Home AFB records search include the following:

1. Mr. Myron Anderson, AFESC, Program Manager, Phase I

2. Mr. Gil Burnet, TAC, Command Program Manager, Phase I

3. Mr. James Pedrick, Mountain Home AFB, Environmental Coordinator

4. Capt. Terry Fairman, Mountain Home AFB, Chief of Bioenvironmental Engineering

E. METHODOLOGY

The methodology utilized in the Mountain Home AFB records search is shown graphically on Figure 4 (page I-7). First, a review of past and present industrial operations was conducted at the base. Information was obtained from available records such as shop files and real property files, as well as interviews with past and present base employees from the various operating areas of the base. The information obtained from interviewees on past activities was based on their best recollection. A list of 42 interviewees from Mountain Home AFB, with areas of knowledge and years at the installation, is given in Appendix C.

The next step in the activity review process was to determine the past management practices regarding the use, storage, treatment, and disposal of hazardous materials from all the industrial operations on the base. Included in this part of the activity review was the identification of past landfill sites and burial sites; as well as other possible sources of contamination such as major PCB or solvent spills, or fuel-saturated areas resulting from significant fuel spills or leaks.

An aerial overflight and a general ground tour of identified sites was then made by the records search team to gather site-specific information including evidence of environmental stress and the presence of nearby drainage ditches or surface-water bodies. These water bodies were

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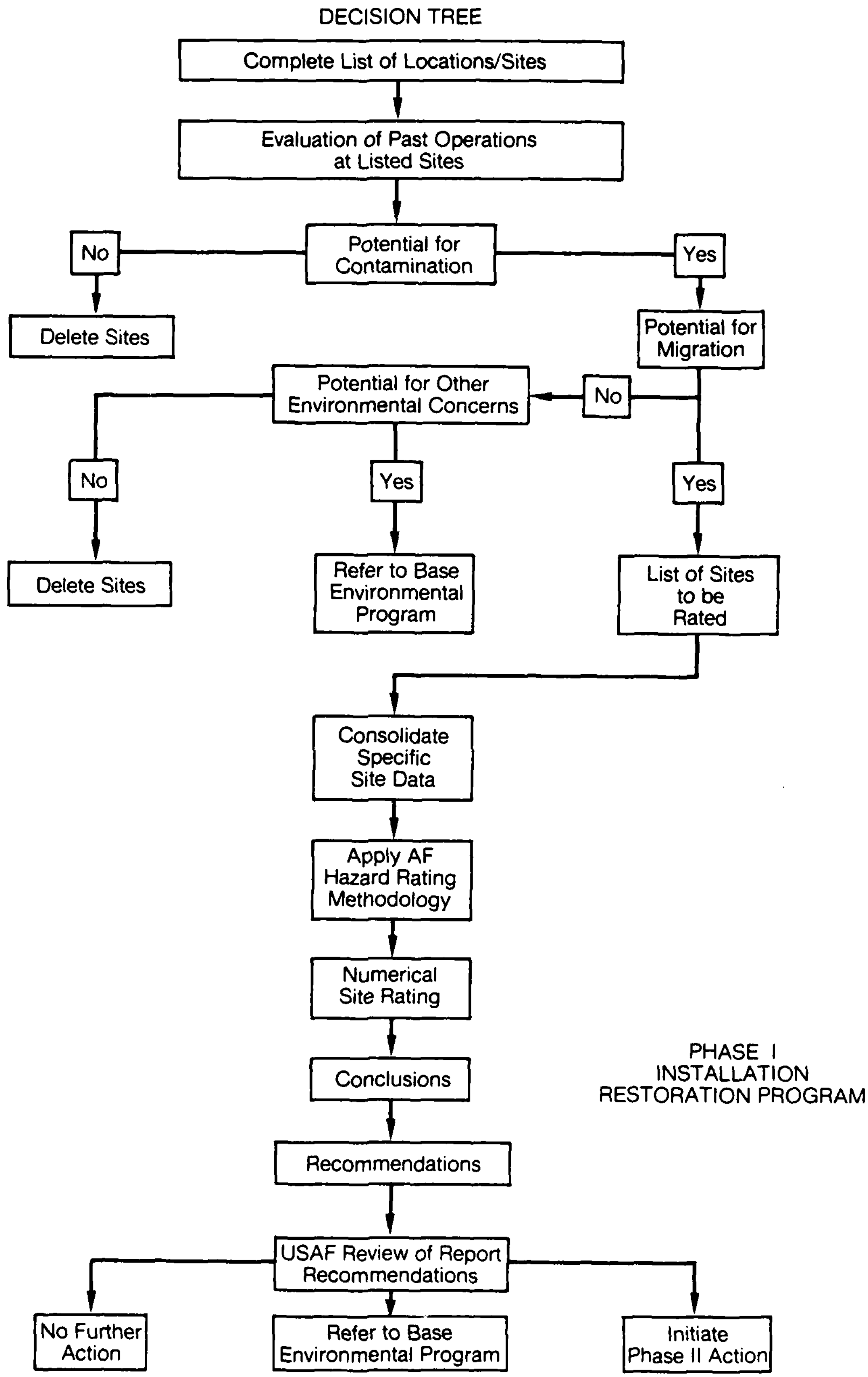

FIGURE 4.
Records Search Methodology.

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inspected for any evidence of contamination or leachate migration.

A decision was then made, based on all of the above information, as to whether a potential existed for hazardous material contamination from any of the identified sites. If not, the site was deleted from further consideration. Minor operations and maintenance deficiencies were noted during the investigations and were made known at the outbriefing.

For those sites at which a potential for contamination was identified, the potential for migration of this contamination was evaluated by considering site-specific soil and ground-water conditions. If there was no potential for contaminant migration, but other environmental concerns were identified, the site was referred to the base environmental monitoring program. If no further environmental concerns were identified, the site was deleted from consideration. If the potential for contaminant migration was identified, then the site was rated and prioritized using the site rating methodology described in Appendix D, "Hazard Assessment Rating Methodology."

The site rating indicates the relative potential for adverse environmental impact at each site. For those sites showing a significant potential, recommendations were made to quantify the potential contaminant migration problem under Phase II of the Installation Restoration Program. For those sites showing a low potential, no Phase II work was recommended.

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II. INSTALLATION DESCRIPTION

A. LOCATION

Mountain Home AFB is located on approximatley 5,800 acres of land on a plateau approximately 2 miles north of the Snake River in Elmore County, Idaho. State Highway 67 is the access road from Mountain Home AFB to the town of Mountain Home, which is about 10 miles to the northeast. The closest large city is Boise, about 50 miles to the northwest. Access between the town of Mountain Home and Boise is provided by Interstate Highway 84.

Off-base sites include the Saylor Creek Electronic Warfare Range, the Small Arms Range Annex, and Strike Dam Recreation Annex. The Saylor Creek Range is located about 20 air miles southeast of Mountain Home AFB. The range covers an area of 174 square miles. The ordnance impact area, which contains all of the targets, is a fenced area of approximately 13,000 acres near the center of the range. The Small Arms Range Annex is located approximately 1 mile north of the base boundary. The range is an irregular shape approximately 1-1/2 miles by 2 miles. The Strike Dam Recreation Annex consists of 3 acres of land located about 7 air miles southwest of Mountain Home AFB on the C. J. Strike Reservoir, an impoundment of the Snake River.

The current boundaries of Mountain Home AFB are shown on Figure 5 (page II-2). The location of the Saylor Creek Electronic Warfare Range, the Small Arms Range Annex, Strike Dam Recreation Annex, and the town of Mountain Home are shown on Figure 3 (page I-3).

B. ORGANIZATION AND MISSION

Mountain Home AFB was established in 1943. For the remainder of World War II, it served as a base for several

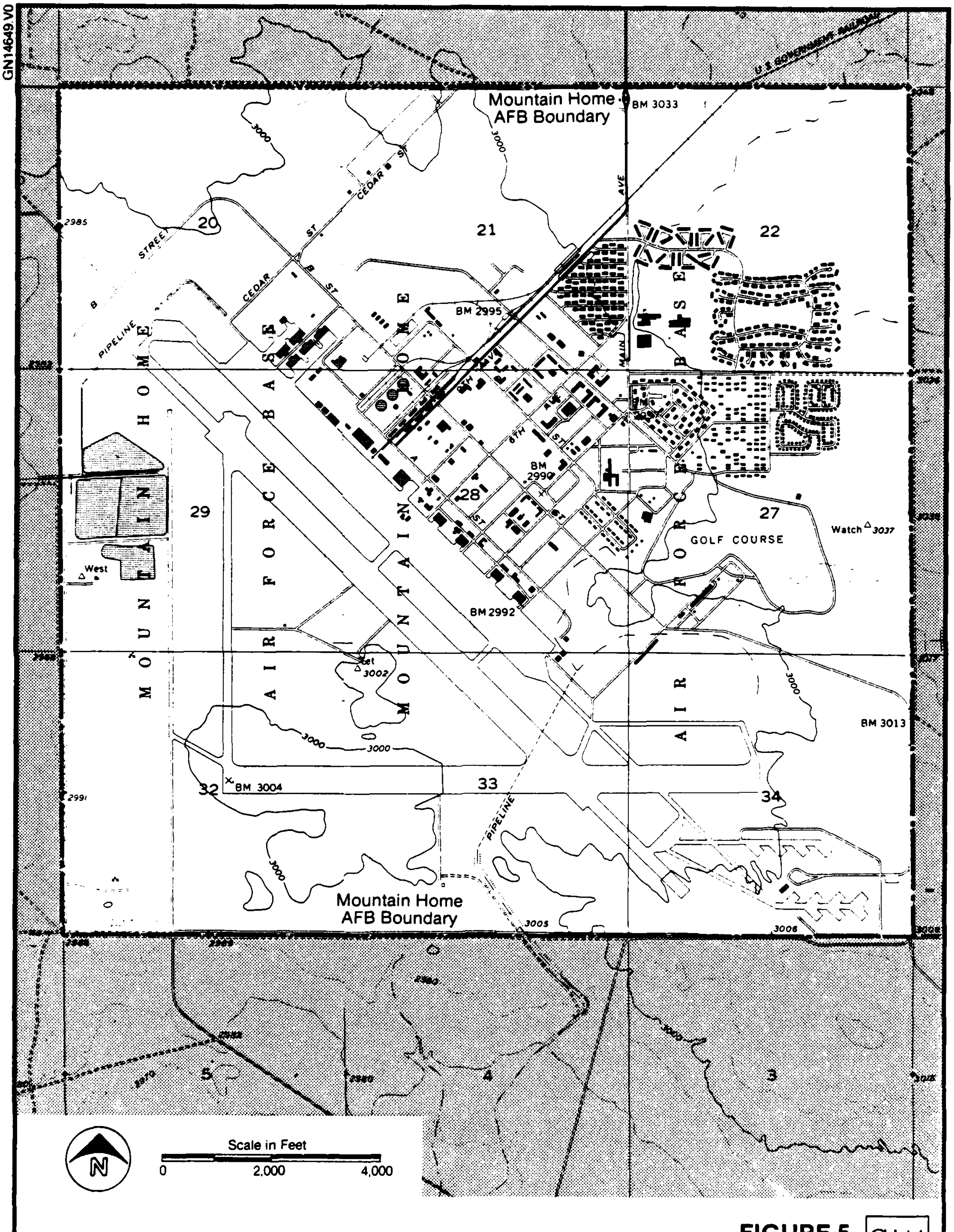

FIGURE 5.
Site Map of Mountain Home AFB, Idaho.

different bombardment groups. Mountain Home AFB was placed on inactive status in the fall of 1945. It was reactivated as a Strategic Air Command (SAC) based in 1948, but was again deactivated in 1950. The base was reassigned to the Military Air Transport Service (MATS) in 1951 and served as a training base for Aerial Resupply and Communication (ARCS) wings through 1953. SAC assumed control in 1953 and remained at Mountain Home AFB until 1965. In 1965, the Tactical Air Command (TAC) assumed control of the base, and continues to do so today.

Since 1972, the 366th Tactical Fighter Wing (TFW) has been assigned to Mountain Home AFB. The mission of the 366th TFW is to develop and maintain tactical fighter squadrons. A subordinate mission of the wing is to provide trained combat air crews and maintenance personnel to tactical organizations worldwide. The aircraft flown by the 366th TFW is the F-111A. Mountain Home AFB had the additional distinction of successfully testing and evaluating the EF-111A aircraft in the late 1970s. This aircraft was designed for a purely electronic warfare mission.

Since the inception of Mountain Home AFB, the major aircraft stationed there have included the B-24, B-47, KC-97, RF-4C, F-111A, F-111F, and EF-111A. From 1960 to 1965, Mountain Home AFB provided support for three Titan I missile complexes. The base currently supports a squadron of UH-1N helicopters.

The major organizations and missions assigned to Mountain Home AFB are listed below:

- 366th Tactical Fighter Wing
- 366th Combat Support Group

- 2036th Communications Squadron
- 4444th Operations Squadron (EF-111A)
- Detachment 3, Tactical Air Warfare Center
- Detachment 18, 25th Weather Squadron
- Detachment 22, 40th Aerospace Rescue and Recovery Mission
- Detachment 513, Field Training

The workforce presently at Mountain Home AFB is approximately 4,700, of whom 4,000 are military personnel and 700 are civilian employees.

A more detailed description of the base history and its mission is included in Appendix E.

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III. ENVIRONMENTAL SETTING

A. METEOROLOGY

Mountain Home AFB and the Saylor Creek Electronic Warfare Range lie in the Upper Sonoran Desert Life Zone. The climate is strongly influenced by the precipitation shadow of the Oregon Coast Range and the Cascade Mountains. Average monthly temperatures range from 30°F in January to 76°F in July with an average annual temperature of 52°F. Precipitation for the period 1951-1979 averaged 8.0 inches per year including an average of 9 inches of snowfall each year. The mean annual lake evaporation rate, commonly used to estimate the mean annual evapotranspiration rate, averages an estimated 35.0 inches per year. Therefore, the annual net precipitation (mean annual precipitation minus mean annual evapotranspiration) for the Mountain Home AFB area is approximately -27.0 inches per year. Meteorological data for Mountain Home AFB are summarized in Table 2.

Wind direction is highly variable, blowing predominantly from the northwest during the spring and summer, and from the east to east-southeast during the fall and winter. Wind speeds average 6 mph or less 39 percent of the time and 7-16 mph 41 percent of the time. Strongest winds generally occur in late winter and spring or during summer thunderstorms. Thunderstorms are generally widely scattered and of short duration and tornadoes are rare in southwestern Idaho.

B. PHYSICAL GEOGRAPHY

Mountain Home AFB is located on the Mountain Home Plateau approximately 2 miles north of the Snake River (see Figure 6, page III-3). The Mountain Home Plateau is a rolling upland plain, much of which is covered by windblown sediments. The plateau surface slopes gently downward to

Table 2
METEOROLOGICAL DATA SUMMARY FOR MOUNTAIN HOME AFB[a]

	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
Temperature (°F)													
Highest	64	68	78	92	97	105	109	108	104	91	73	63	109[b]
Average Maximum	37	44	52	61	71	81	92	89	79	65	49	39	63
Average	30	36	41	49	58	67	76	74	64	52	40	32	52
Average Minimum	22	27	30	36	45	53	60	57	49	38	30	23	39
Lowest	-22	-9	1	17	24	30	39	35	24	15	-5	-22	-22[b]
Monthly Precipitation (inches)													
Maximum	2.9	1.9	1.7	1.9	2.2	2.2	1.7	3.3	1.6	1.6	2.1	2.0	3.3[b]
Mean	1.1	0.7	0.6	0.7	0.7	0.9	0.3	0.4	0.4	0.4	0.9	0.9	8.0
Minimum	0.2	0.1	T[c]	0.1	0.1	T	T	0	0	0	0.1	0	0[b]
24-Hour Maximum	0.7	0.5	0.6	0.8	0.9	1.4	0.8	1.3	0.7	0.6	0.8	0.6	1.4[b]

[a]Period of record 1951-1979; Source: USAFETAC, April 1980.
[b]Represents greatest extreme
[c]T = trace

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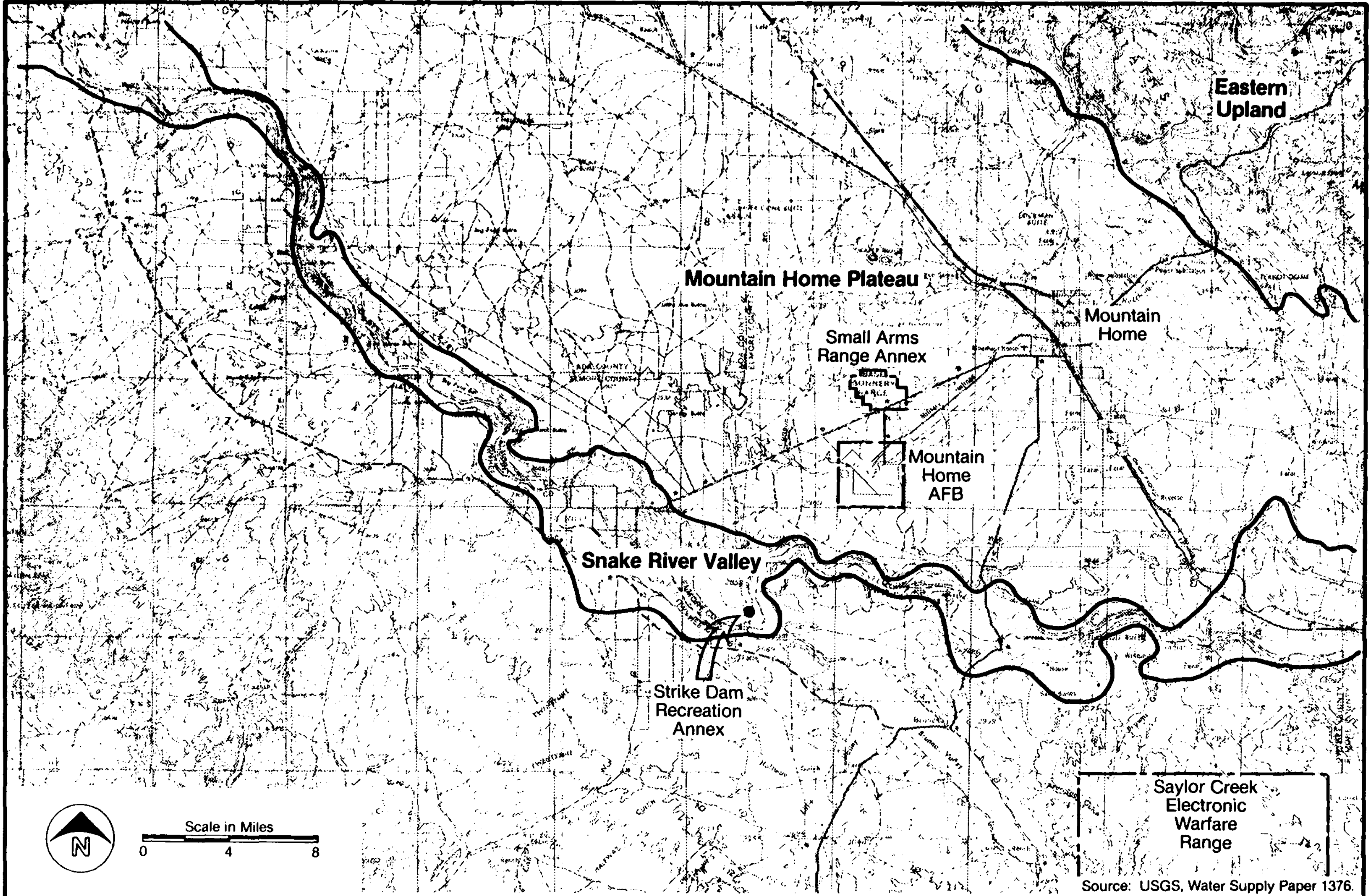


Source: USGS, Water Supply Paper 1376.

FIGURE 6.
Physiographic Map.

the north, west, and southwest from an altitude of 3,200 feet above mean sea level (ft-msl) at the community of Mountain Home to approximately 2,700 ft-msl near Kuna. Elevations at the base range from 3,049 ft-msl at the northeast corner to approximately 2,985 ft-msl at the western boundary.

Although the Mountain Home Plateau is generally flat, several cinder cones and shield (broad, flat) volcanos rise above the surface of the plain near the base, reminders of past volcanic activity.

The Snake River, which forms the southern and southwestern boundary of the Mountain Home Plateau, flows in a canyon which is 300 to 500 feet below the surface of the plateau. The plateau is bounded on the north and east by the Bennett Hills, a region of high relief and grades into the Boise Valley to the northwest.

The Mountain Home Plateau is drained by a series of intermittent streams which discharge to the Snake River. Flow of these streams is controlled by seasonal weather conditions for the most part. Canyon Creek (an intermittent stream) is the nearest surface watercourse to the base, and is located about 4 miles west of the base boundary.

Most of the base surface water discharge is to Canyon Creek via a series of ditches which collect runoff and direct it to a point midway along the western boundary line (see Figure 7, page III-5). This discharge point is equipped with a dam and two lift pumps which are used to transfer storm water from behind the dam to the sewage lagoons. Only on rare occasions, due to heavy rainfall, does storm water leave the base via this discharge point.

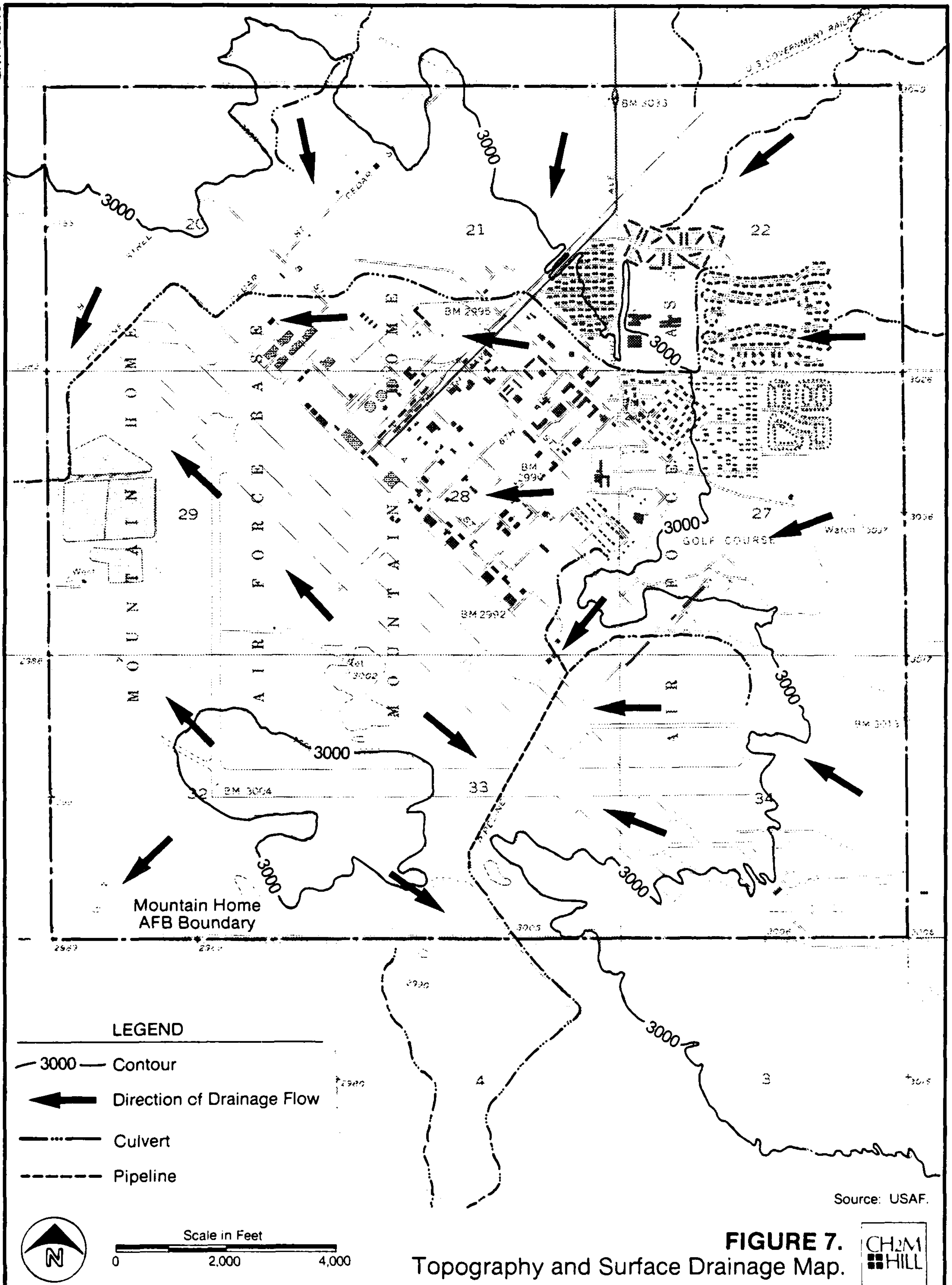


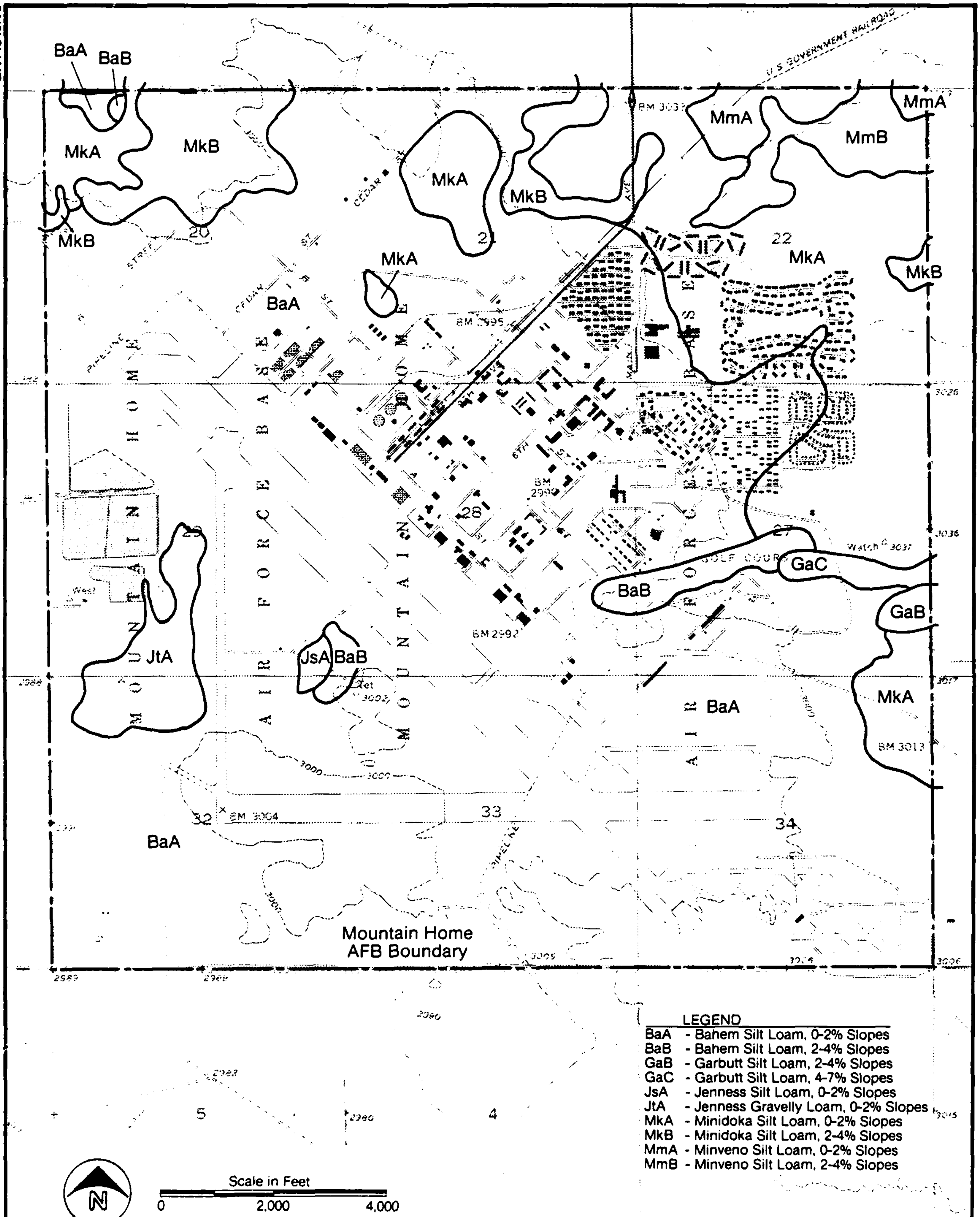
FIGURE 7.
Topography and Surface Drainage Map.

Streamflow and storm-water discharge are both regulated by seasonal weather patterns. Stream discharge is highest in the spring when water from melting snows in the mountains north of the plateau is carried to the Snake River. Even during spring thaw most of the streamflows will infiltrate through the permeable sediments and never reach the Snake River.

Soil associations on the base are typical of the entire plateau, consisting mostly of silty loam of eolian origin (windblown). Soils on base (Figure 8, page III-7) were described by the U.S. Department of Agriculture, Soil Conservation Service as follows:

1. Bahem Series (General): This series consists of well-drained, nearly level to steep, medium textured soils. These soils formed in wind-laid, calcareous silts or silty alluvium consisting of mixed mineral material. They occur on medium and high terraces, fans, and uplands. Natural vegetation in uncultivated areas of the Bahem series consists mainly of sagebrush, cheatgrass, wild mustard, and winter fat. Bahem soils are used mostly for irrigated crops such as alfalfa, clover, corn, sugar beets, potatoes, onions, and small grains.

    a. Bahem Silt Loam, 0 to 2 percent slopes (B a A): This type soil normally occurs on medium and high terraces, fans, and uplands. In a typical profile, the



Source: U.S. Soil Conservation Service.

FIGURE 8.
Soils Map.

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surface layer is light-gray silt loam approximately 7 inches thick. The next layer is approximately 53 inches thick. In sequence from the top, the top layer is light-gray silt loam, the next layer is light brownish-gray very fine silty loam, and the lower 12 inches is light brownish-gray fine sandy loam. Bahem soil is deep and is moderately permeable. The organic-matter content is low to moderately low and the fertility is high. Runoff is slow and there is little or no erosion hazard.

b. Bahem Silt Loam, 2 to 4 percent slope (B a B): This soil occurs on terraces and fans. Runoff is medium and erosion is a slight to moderate hazard when irrigated.

2. Garbutt Series (General): This series consists of well-drained, level to moderately sloping, medium-textured soils. These soils occur on alluvial fans and low terraces, and are formed in light silty alluvium derived from lacustrine sediments. A varying percentage of the very fine sand fraction of the soils is volcanic ash and glass.

a. Garbutt Silt Loam, 1 to 3 percent slopes (G a B): This type soil occurs on alluvial fans and terraces. In a typical profile, the upper layer is a light brownish-gray silt loam. The middle layer, which is roughly three times as thick, is a friable, light-gray,

moderately calcareous silt loam which is underlain by loam or silt loam alluvial deposits stratified with thin layers of coarse textured materials. The soil is well drained and is moderately permeable. The organic-matter content is low to moderately low, and fertility is high. Runoff is medium and there is a slight to moderate erosion hazard when irrigated. The soil is relatively high in content of soluble salts and exchangeable sodium which can be readily leached through normal irrigation. This type soil is suitable for irrigated alfalfa, corn, sugar beets, potatoes, small grains, vegetables, and improved pasture.

b. <u>Garbutt Silt Loam, 4 to 7 percent slope (G a C)</u>: This soil normally occurs on alluvial fans. Runoff is medium to rapid and erosion hazards exist. Vegetation in uncultivated areas is mainly cheatgrass, wild barley, wild mustard, budsage, and sage.

Permeability of the soils on base are low to moderate ranging from 3×10^{-4} to 3×10^{-3} ft/min.

Geologically, Mountain Home AFB is located in a huge basin formed by a trough-like, impermeable floor of consolidated volcanic rock referred to as the Idaho Batholith. This structure lies at greater than 10,000 feet below the base and it forms the depositional trough into which the overlying sediments and volcanics occur.

Formations present within the Mountain Home Plateau range in age from Cretaceous (135 million years old) to recent. The areal extent of these rock units are illustrated in Figure 9, page III-11. In general, geology at Mountain Home AFB consists of alternate strata of basalt flows separated by unconformities (erosional surface) with some interbedded lacustrine (lake) and fluvial (stream) deposits. These deposits are overlain by eolian (windblown) and/or alluvial deposits which tend to smooth out the otherwise rugged volcanic relief. Figure 10, page III-12, is a north-south geologic cross section taken through Mountain Home AFB (the numbered wells are base wells) which illustrates the relationship of the upper water-bearing formations and the effect on the water table of the Snake River Canyon.

Major structural features in the area include the Snake River Plain, a massive topographic depression, and a complex regional system of faults. Few of the faults are traceable to the surface, being concealed by eolian and alluvial deposition. Other structural features in the area include volcanic dikes (molten rock deposition which cuts across formational boundaries), volcanic necks, cinder cones, and shield volcanos.

Geologic formations of significance to ground-water contamination consist of volcanic and clastic rocks of Pliocene (approximately 10 million years old) to recent age. Table 3 lists the major geologic formations occurring in the vicinity of Mountain Home AFB along with formation descriptions and water-bearing characteristics.

C. HYDROLOGY

A low precipitation rate (8 inches/year) and a high evaporation rate typify meteorological conditions at

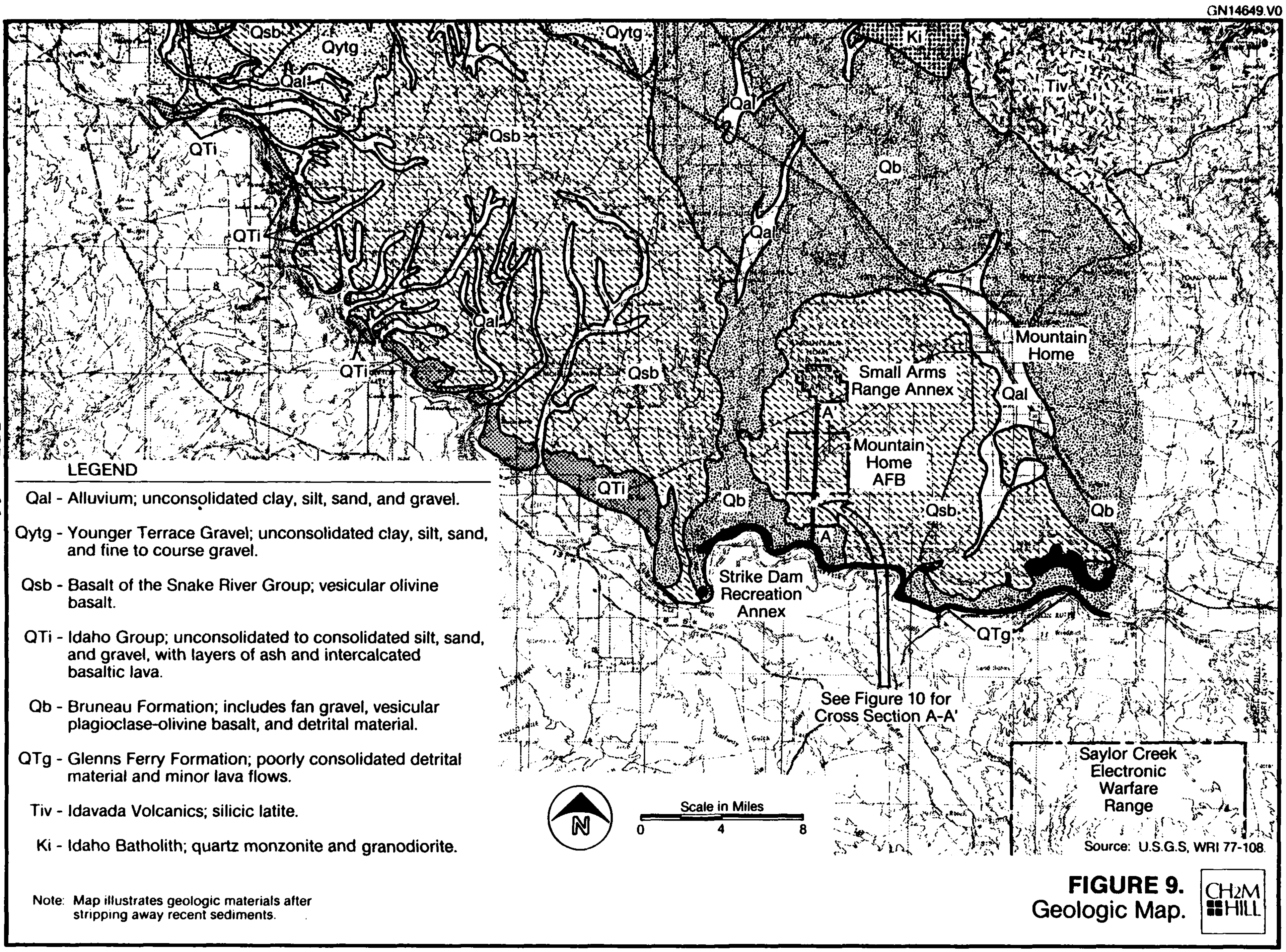

FIGURE 9.
Geologic Map.

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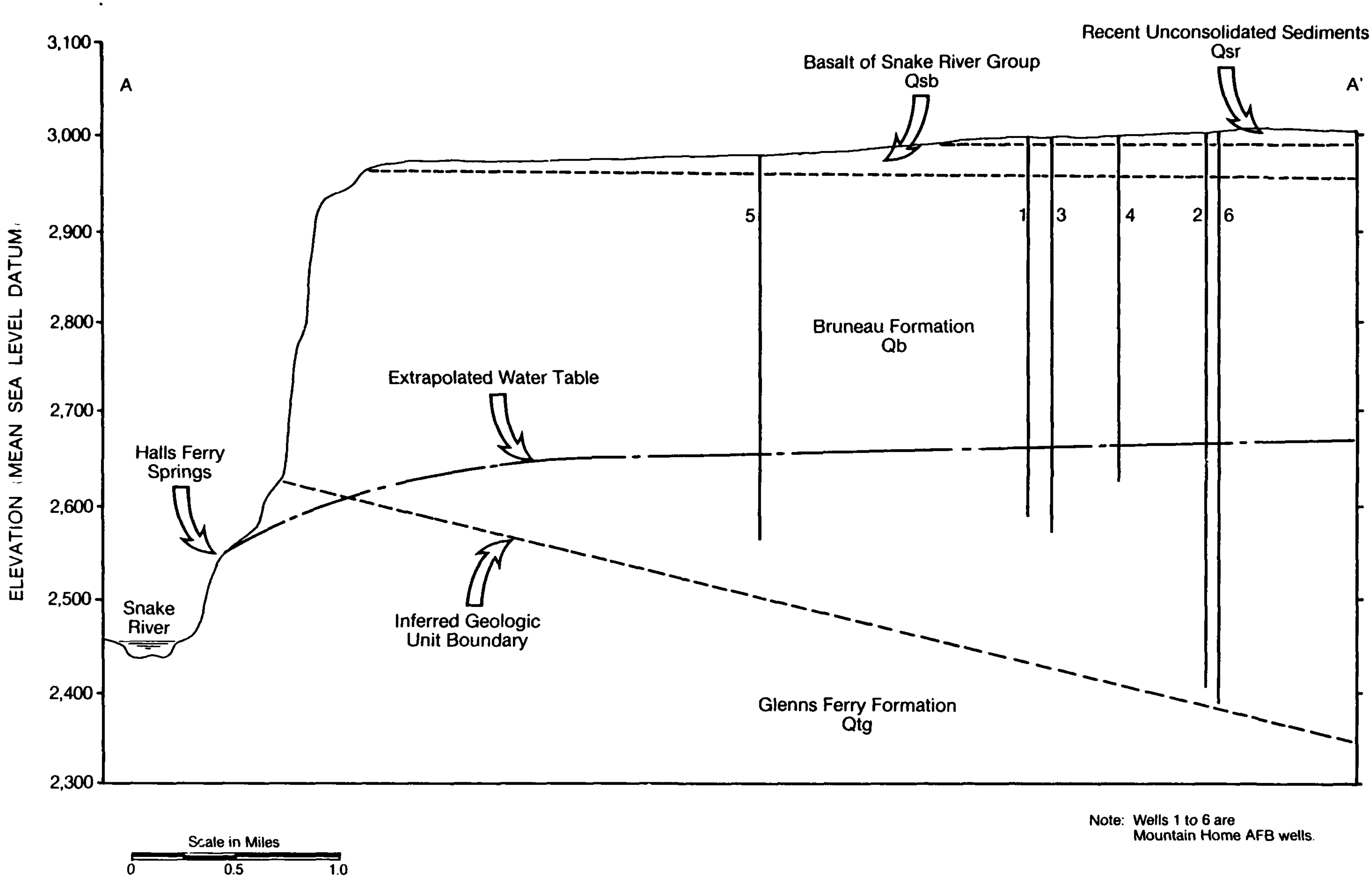

Note: Wells 1 to 6 are Mountain Home AFB wells.

Source: Idaho Dept. of Reclamation, WIB No. 4.

Note: Cross Section A-A' defined on Figure 9.

FIGURE 10.
Diagrammatic Cross Section from the Snake River to Mountain Home AFB.

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Table 3
DESCRIPTION AND WATER-BEARING CHARACTERISTICS
OF GEOLOGIC UNITS IN THE MOUNTAIN HOME PLATEAU AREA

Period	Epoch	Geologic Unit	Description	Water-Bearing Characteristics
Quaternary	Holocene	Alluvium	Unconsolidated clay, silt, sand, and gravel occurring beneath flood plains of Boise and Snake Rivers. Crops out in narrow belts along major tributaries and in a broad belt near Mountain Home. Thickness probably does not exceed 70 feet.	Hydraulic conductivity generally high; however, because of thinness and irregularity of beds, yields to wells are generally small to moderate. Most important along Boise River flood plain where well yields of 2,500 gal/min are reported.
	Holocene and Pleistocene	Younger terrace gravel	Unconsolidated clay, silt, sand, and fine to very coarse gravel. Mapped only along Holocene alluvium near Boise River and western part of study area. Thickness probably does not exceed 100 feet.	Hydraulic conductivity generally high; however, unit is almost entirely above water table in study area.
	Holocene and Pleistocene	Basalt of Snake River Group	Vesicular olivine basalt, light to dark gray, irregular to columnar jointing. Crops out on much of Mountain Home plateau and in Boise Valley. Intercalated in places with older terrace gravels. Thickness of flows probably does not exceed 550 feet.	Hydraulic conductivity variable. Where saturated, reported well yields range from 20 to 3,100 gal/min; however, the basalt is above water table in most of study area.
	Pleistocene	Older terrace gravel	Unconsolidated clay, sand, and fine to coarse gravel. Occurs only in western part of study area where thickness does not exceed 150 feet.	Hydraulic conductivity generally high. Reported well yields range from 20 to 2,700 gal/min.
Quaternary and Tertiary	Pleistocene and Pliocene	Idaho Group, Undifferentiated	Poorly to well-stratified fluvial and lake deposits of unconsolidated to consolidated silt, sand, and gravel, with layers of ash and intercalated basaltic lava flows. Thickness unknown.	Hydraulic conductivity generally high. Reported well yields range from 15 to 3,000 gal/min.
Quarternary	Pleistocene	Bruneau Formation of Idaho Group	Includes fan deposits consisting large of coarse sands derived from decayed granitic rocks. Thickness of fan deposits does not exceed 300 feet. Also includes vesicular olivine basalt, dark gray to black, weathers to reddish-gray-brown. Thickness of basaltic flows is about 800 feet in study area. Unit also includes detrital material, dominated by massive lake beds of white-weathering fine silt, clay, diatomite, and minor amounts of sand.	Fan deposits are generally above water table. Basalt composes principal aquifer in Mountain Home area. Reported well yields from basalt range from 10 to 3,500 gal/min. Detrital material generally has low hydraulic conductivity.

Table 3--Continued

Period	Epoch	Geologic Unit	Description	Water-Bearing Characteristics
Quarternary and Tertiary	Pleistocene and Pliocene	Glenns Ferry Formation of Idaho Group	Poorly consolidated detrital material and minor flows of olivine basalt. Includes lake and stream deposits consisting of massive silt layers, cemented sand beds, thin beds of dark clay, olive silt, and granitic sand and fine pebble gravel. Maximum thickness is about 2,000 feet.	Hydraulic conductivity generally low. Reported well yields range from 3 to 350 gal/min.
Tertiary	Miocene	Idavada Volcanics	Silicic latite; chiefly thick layers of devitrified welded tuff, but includes some vitric tuff and lava flows. Maximum thickness is about 2,000 feet.	Hydraulic conductivity variable.
Cretaceous		Idaho Batholith	Quartz monzonite and granodiorite, light to medium gray.	Hydraulic conductivity low. Yields to wells small.

Source: H. W. Young, USGS, Water Resource Investigation 77-108.

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Mountain Home AFB. Surface runoff is therefore limited to discharge through gulches and canyons following periods of precipitation. The two main drainage systems in the vicinity of the base are Canyon Creek, located west of the base and Rattlesnake Creek to the east. Both creeks, although dry most of the time, discharge to the Snake River. Base drainage discharges to Canyon Creek on the few occasions when storm water is released from the dam.

Water use classifications for segments of the Snake River are presented in Appendix F. Also provided in Appendix F is an explanation of the Idaho water use classifications as well as some representative water quality data.

Two large springs occur in the vicinity of the base along the north canyon wall of the Snake River. Halls Ferry Springs, located due south of the base, discharges at a point 50 feet above the surface of C. J. Strike Reservoir at a rate of approximately 800 gpm. Weatherby Springs, also located due south of the base, discharges at approximately the same elevation as the reservoir. Both springs are discharge points for the regional aquifer occurring in the Bruneau Formation. The geologic cross section in Figure 10, page III-12, illustrates the sloping water table of the aquifer discharging to the Snake River.

Ground-water occurrence in the vicinity of Mountain Home AFB is under both confined and unconfined conditions within volcanic and alluvial materials. The regional aquifer is developed within the basalts of the Bruneau Formation, Idaho Group, and poorly consolidated detrital material and minor basalt flows of the Glenns Ferry Formation, Idaho Group. The Bruneau Formation consists of vesicular olivine basalt flows and detrital materials from a lake bed depositional environment. Ground water occurs under unconfined conditions within the Bruneau Formation.

Wells completed in this formation produce water from the vesicular basalt and reported yields range from 10 to 3,500 gallons per minute (gpm). Mountain Home AFB wells produce from the Bruneau Formation.

The Glenns Ferry Formation consists of lenticular beds of sand, sandstone, silt, and clay in the upper part of the formation. The lower part consists of various basalt flows interbedded with limestone, blue clay, or gravel deposits. Ground water occurs under confined conditions and well yields range from a few gallons per minute to thousands of gallons per minute when producing from the sand and gravel deposits. This formation, as illustrated in Figure 10, page III-12, slopes downward to the north from the Snake River where it outcrops on the canyon wall. On-base wells do not penetrate the Glenns Ferry Formation.

Ground-water elevations within the regional aquifer (Bruneau Formation) in the vicinity of the base are at approximately 2,600 ft-msl. Land surface elevation at the base is approximately 3,000 ft-msl making depth to water level 400 feet (see Figure 11, page III-17). Direction of ground-water flow is from potentiometric highs where recharge occurs towards natural discharge points along the Snake River. Locally ground-water flow paths deviate toward pumping wells which have recently become important as major aquifer discharge points.

Figure 12, page III-18, illustrates the effect ground-water development for irrigation has had on the potentiometric surface between 1976 to 1981. From this figure it is clear that a large cone of depression has developed just east of the base where water levels have declined as much as 45 feet at the center of the depression. Water-level declines at the base have been between 5 and 25 feet in the same 5-year period.

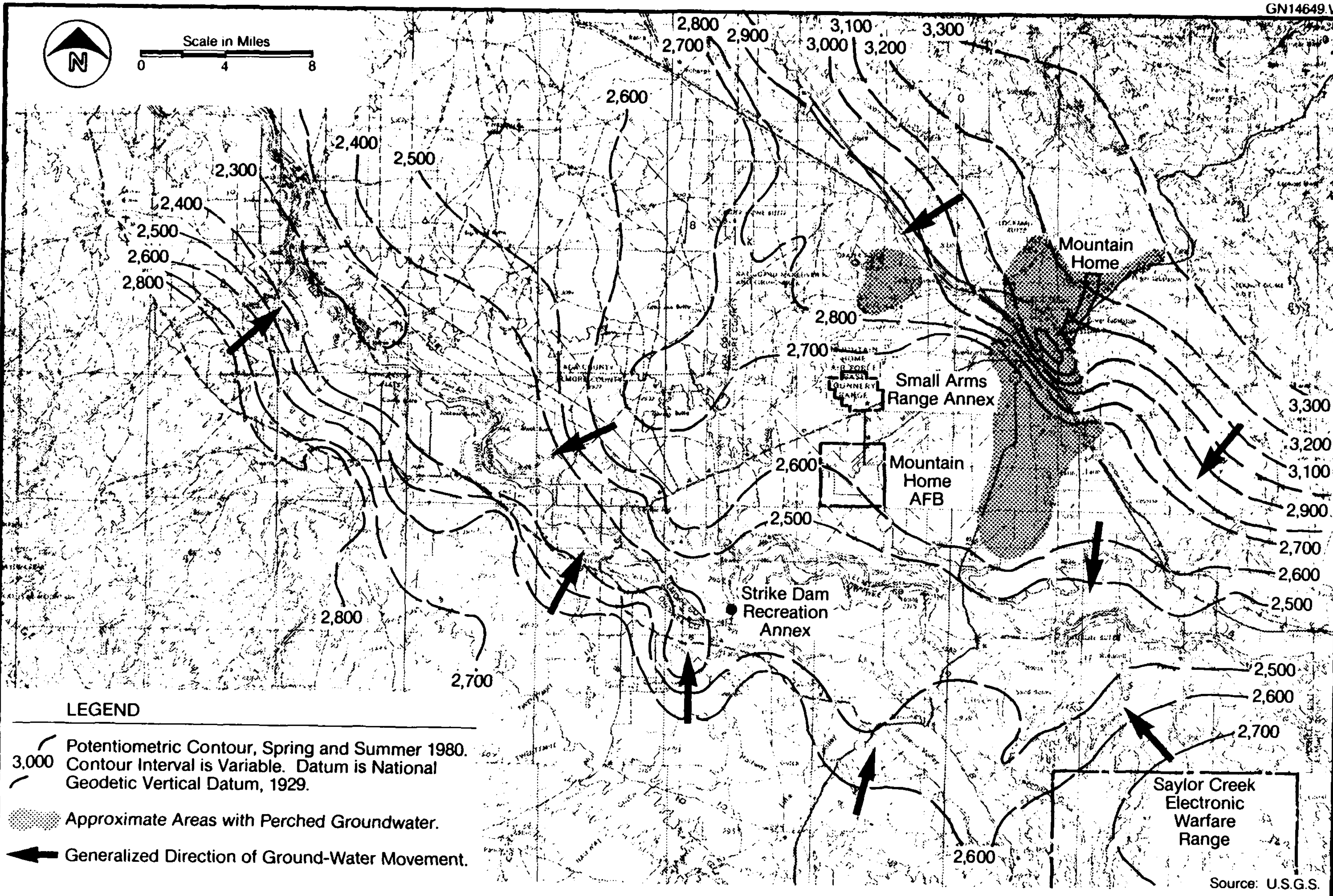

FIGURE 11.
1980 Potentiometric Map.

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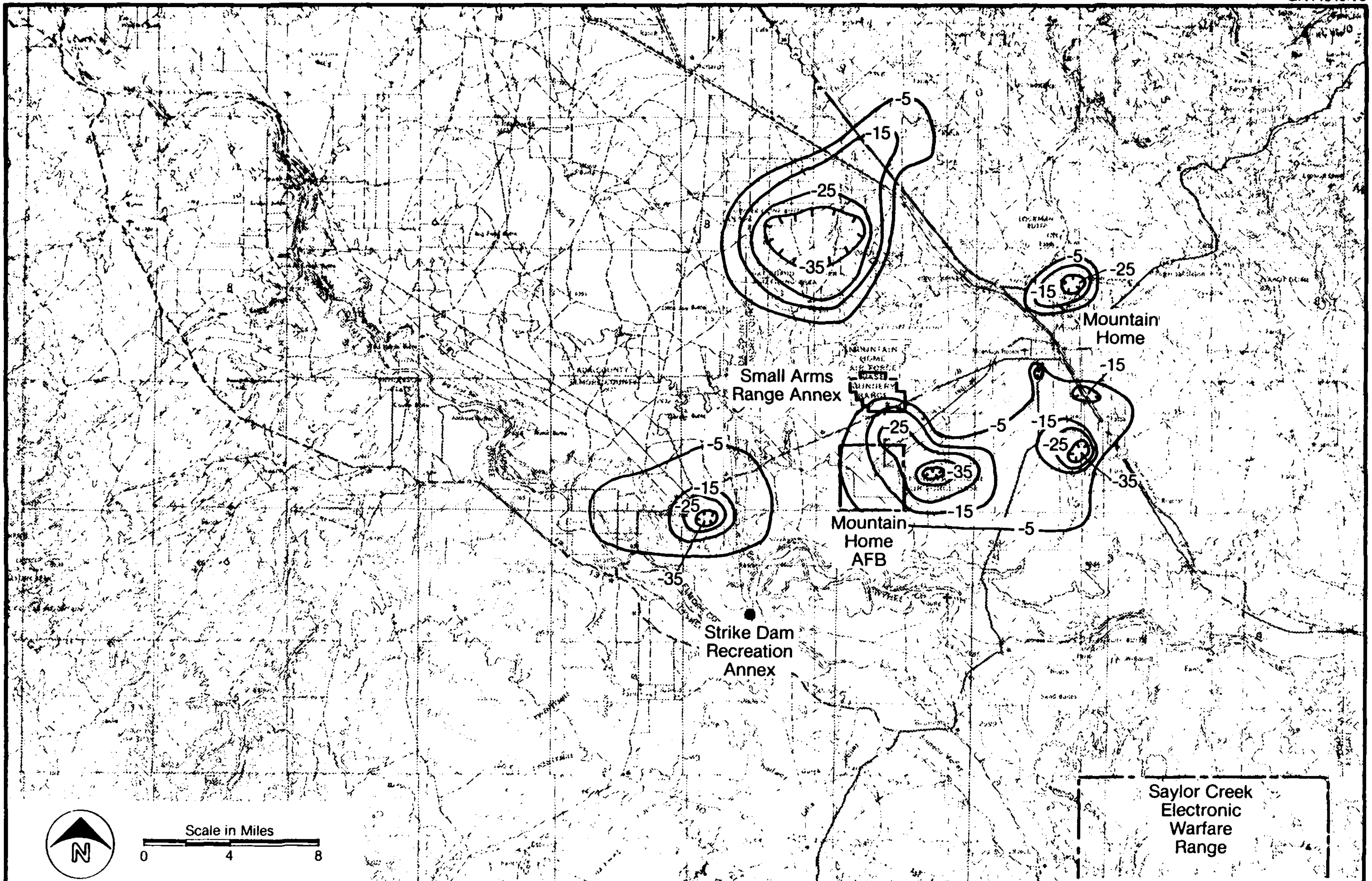

Source: Idaho Dept. of Water Resources.

FIGURE 12.
Change in Water Levels in the Regional Aquifer, 1976 to 1981 in Feet.

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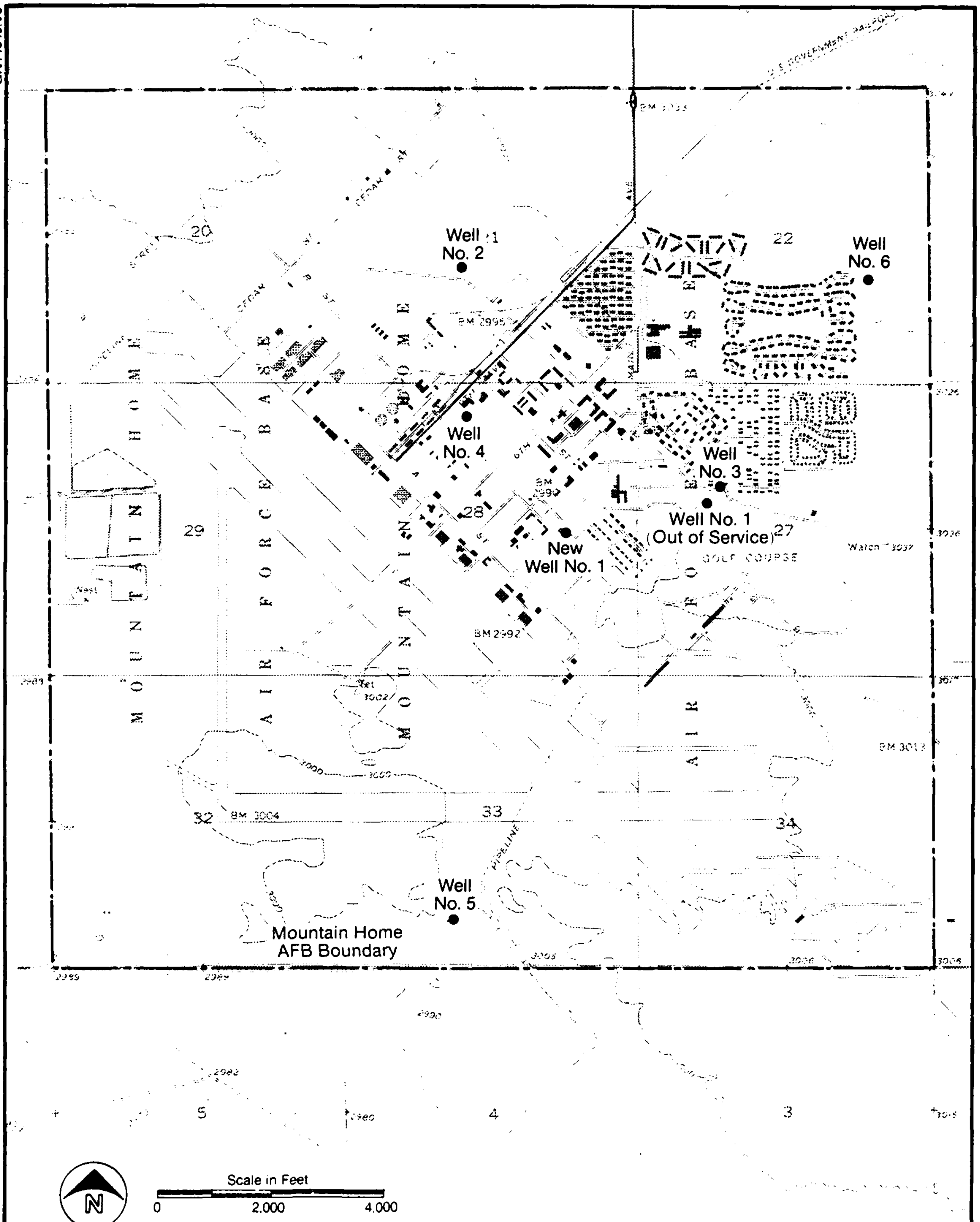
Recharge to the regional aquifer at the base is limited by low rate of precipitation, a high evaporation rate, and a deep water table. Recharge occurs as downward percolation of precipitation that falls on rock outcrop areas in the mountains north of the plateau (approximately 20 miles from the base). Some recharge also occurs as seepage through intermittent streambeds. There is probably some recharge obtained by return flow from irrigation.

Aquifer characteristics of the Bruneau Formation are extremely variable and depend largely on the development of joints and fractures in the porous basalt. Well specific capacities as high as 300 gpm/ft of drawdown are common. Aquifer transmissivity would then be approximately 80,600 ft^2/day. Storage coefficients within this aquifer probably range from 0.001 to 0.40.

Mountain Home AFB derives its water supply from six wells completed in the Bruneau Formation. Figure 13, page III-20, illustrates the location of seven base wells. The original Well No. 1 located next to Well No. 3 was abandoned when the pump could not be removed for replacement. Table 4 lists the base wells along with information regarding construction and capacities. The base uses approximately 2.5 million gallons per day (mgd). Figures 14 and 15, pages III-21 and III-22, illustrate construction details for two base wells.

Ground-water quality within the Bruneau Formation is quite good, containing calcium, magnesium, bicarbonate and carbonate ions in acceptable concentrations. Table 5 lists water quality for base Wells No. 1-6.



Source: USAF.

FIGURE 13.
Water Well Location Map.

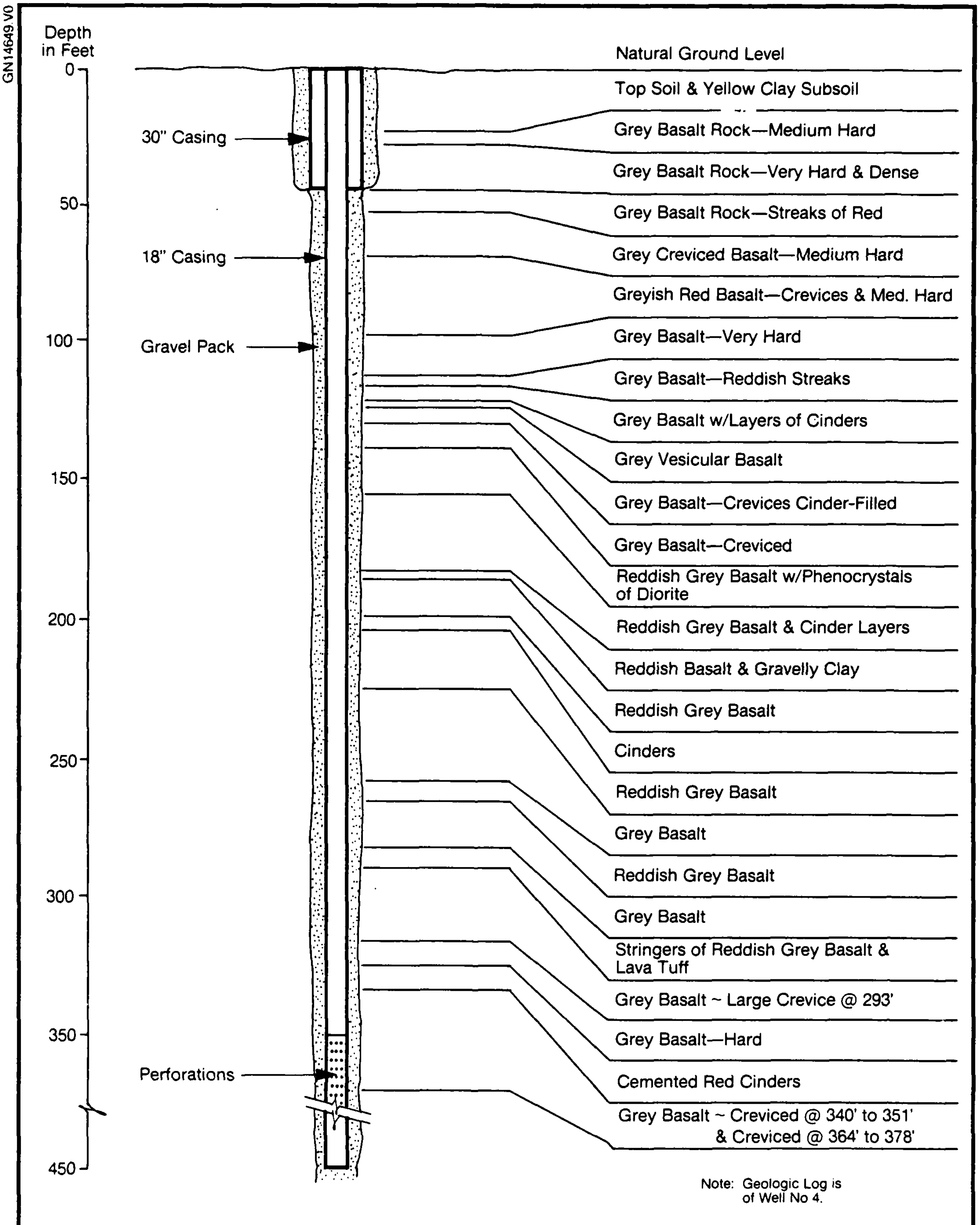


FIGURE 14.
Well Construction Details and Geologic Log for New Well No. 1.

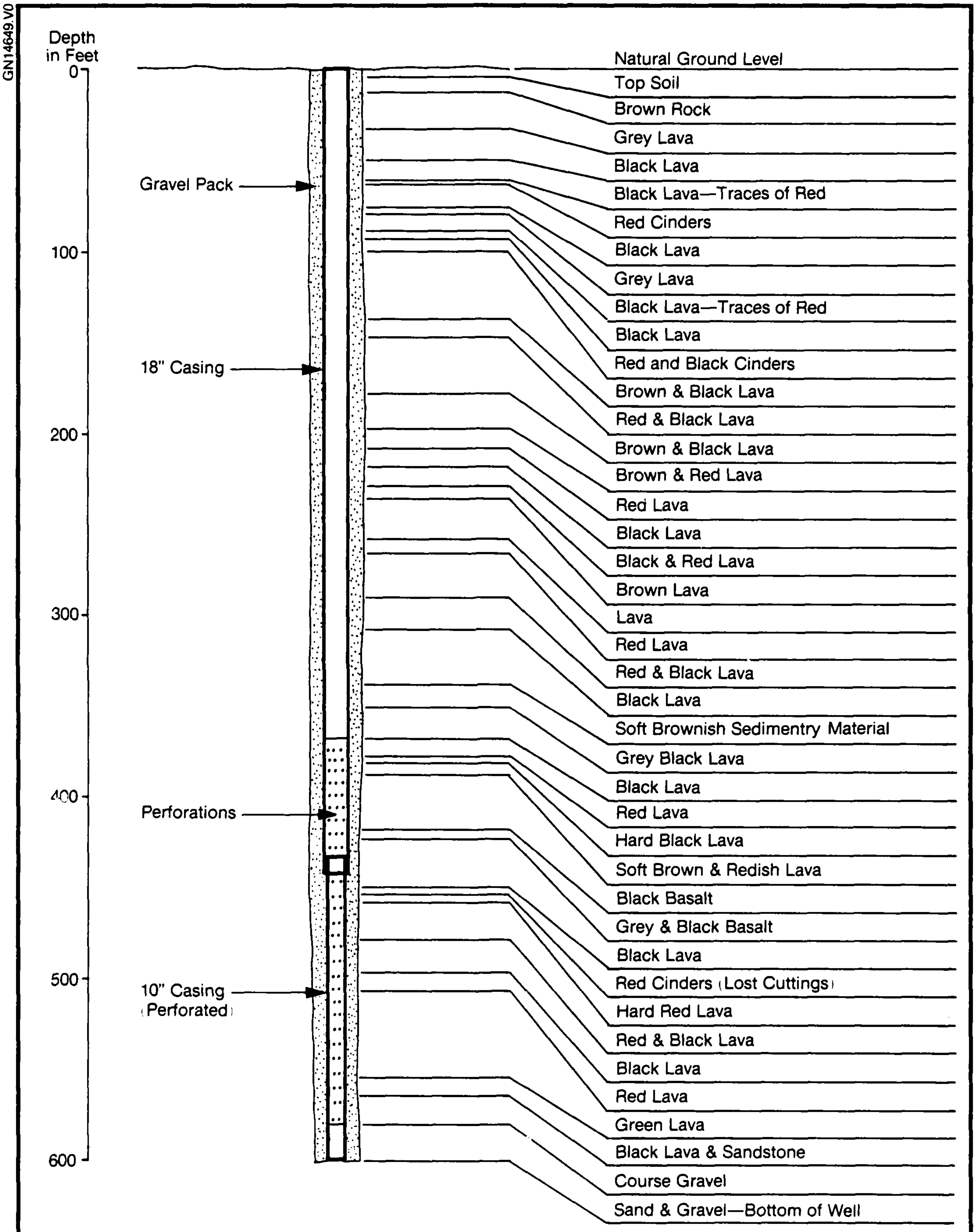


FIGURE 15. CH2M HILL
Well Construction Details and Geologic Log for Well No. 6.

Table 4
WATER WELL DATA

Well No.	USGS No.	Local Identifier No.	Date Constructed	Casing Hole Size (inch)	Total Size (inch)	Depth (feet)	1967 Static Water Level (feet)	Well Yield (gpm)	Specific Capacity (gpm/ft)	Remarks
1 inactive	50	045 OSE 21 CAD1	1942	12	8	409	331	300	150	
1 new	51	045 OSE 22 DAC1	1974	22	18	450	--	--	--	
2	53	045 OSE 27 BCD1	1943	12	8	588	316	750	--	"No Drawdown" reported
3	54	045 OSE 27 BDB1	1943	12	8	425	330	750	--	"No Drawdown" reported
4	55	045 OSE 28 BAD1	1954	21	18	379	326	1,800	257	
5	57	045 OSE 33 CDC1	?	8	6	425	335	16	--	"No Drawdown" reported
6	--	--	1962	20	18	610	347	2,300	164	

Source: USAF, Base Civil Engineer.

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Table 5
WATER QUALITY CHARACTERISTICS OF WELLS[a]

Parameter[b]	Base Wells						EPA Drinking Water Standards
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	
Arsenic[c]	<10	<10	<10	<10	<10	<10	50
Barium[c]	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	1,000
Cadmium[c]	<10	<10	<10	<10	<10	<10	10
Chromium[c]	<50	<50	<50	250	<50	<50	50
Lead[c]	<20	<20	43	38	2,100	<50	50
Mercury[c]	<2	<2	<2	<2	<2	<2	2
Selenium[c]	<10	<10	<10	<10	<10	<10	10
Silver[c]	<10	<10	<10	<10	<10	<10	50
Copper[c]	42	44	<20	24	<20	62	1,000
Iron[c]	520	<100	<100	560	110	1,370	300
Manganese[c]	<50	<50	<50	<50	<50	<50	50
Zinc[c]	<50	<50	<50	515	542	<50	5,000
Calcium as Ca[d]	38.7	15.9	72.7	29.3	32.5	20.9	--
Magnesium as Mg[d]	19.2	3.9	38.5	10.6	17.8	5.6	--
Potassium[d]	6.3	4.3	9.0	4.9	6.7	5.0	--
Sodium[d]	21.7	13.4	33.3	15.4	22.3	12.6	--
Nitrate[d]	10.0	1.5	28.5	5.6	10.0	1.1	10
Fluoride[d,e]	<0.1	0.1	<0.1	<0.1	<0.1	0.8	1.6
Turbidity[e,f]	<1	<1	<1	<1	<1	<1	-
Alkalinity Total as $CaCO_3$[d,e]	113	71	95	83	85	60	--
Chloride[d,e]	48	4	96	16	52	8	250

Table 5--Continued

Parameters	Base Wells No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	EPA Drinking Water Standards
Hardness as $CaCO_3$[d,e]	69	56	340	117	154	75	--
Specific Conductance[e,g]	500	210	1,140	360	570	250	--
Sulfate[d,e]	70	11	250	34	85	30	250

[a]Source: USAF OEHL
[b]Sampled February 1980 unless otherwise noted
[c]Units in µg/l
[d]Units in mg/l
[e]Sampled April 1980
[f]In turbidity units
[g]Units in µmhos/cm

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D. POTENTIAL PATHWAYS FOR GROUND-WATER CONTAMINATION

The potential for ground-water contamination from surface or near surface sources of contamination is somewhat variable. In those areas of the base where the windblown soils with cemented layers occur, contamination potential from surface sources such as fuel spills and fire department training exercises would be very low. This is due to the low permeability of the soil and cemented layers within the soil horizon. In those same areas, however, where the soil layer has been breached by excavation or some other means, the potential for vertical migration of contaminants is much greater. The bedrock, primarily a vesicular basalt, occurs at or near the surface throughout most of the base. Soil cover is thickest on the east side of the base (approximately 20 feet) and thinnest on the west side. Vertical permeability of the basalt is dependent on the occurrence of faults and fractures. In an area which is highly faulted and/or fractured and where the soil has been breached, vertical permeability would be quite high.

Another important pathway for contaminant migration would be via improperly constructed water wells. A contaminant could be introduced into the top of the porous basalt where it would move vertically downward until it encountered strata of low permeability. Flow would then be horizontal (primarily) downgradient until a fault and/or fracture is encountered. Flow would proceed vertically downward along the fault plain until another low permeable strata was encountered. Horizontal flow could then take the contaminant (still well above the regional water table) towards a water well. The well, even if constructed according to proper standards of the time including a 20- to 40-foot cement seal between casing and hole at the top, could provide a direct conduit to the water table. Most wells drilled during the 1940s and 1950s were drilled using

cable tool methods. This method leaves a space between the hole and the casing. Contaminants could reach the well at some point below the cement seal by the mechanism described above.

For this contaminant movement to take place, it would have to have a continuous driving force would be required since permeabilities are low and the upper 400 feet of the basalt formations are dry. This driving force could come from a pond, sewage lagoon, leaky sewage line, or regular irrigation. Figure 16, page III-28, illustrates historic water quality trends from one of the base wells (No. 1 inactive). The graphic illustrates concentrations of chloride, sulfate, and nitrate as well as specific conductance. From 1949 to 1960 there was essentially no change in water quality. The concentrations of all three parameters are within acceptable ranges and compare well with regional water quality trends. However, from 1960 to 1974 water quality deteriorated significantly and for nitrate, has exceeded maximum contaminant levels for potable water. This well is located near the base golf course where heavy use of nitrogen fertilizers is common and also near areas of heavy domestic sewage system use (base housing). Although nitrate concentrations in Well No. 1 (and also Well No. 3) are not attributable to hazardous waste disposal, the viability of this pathway is illustrated by this example.

E. ENVIRONMENTALLY SENSITIVE CONDITIONS

1. Habitat

Potential natural vegetation in southwest Idaho is composed of mixed associations of big sagebrush, winterfat, shadscale, and native and introduced grasses and forbs. Dominant grasses include bluegrass, cheatgrass, and crested wheatgrass.

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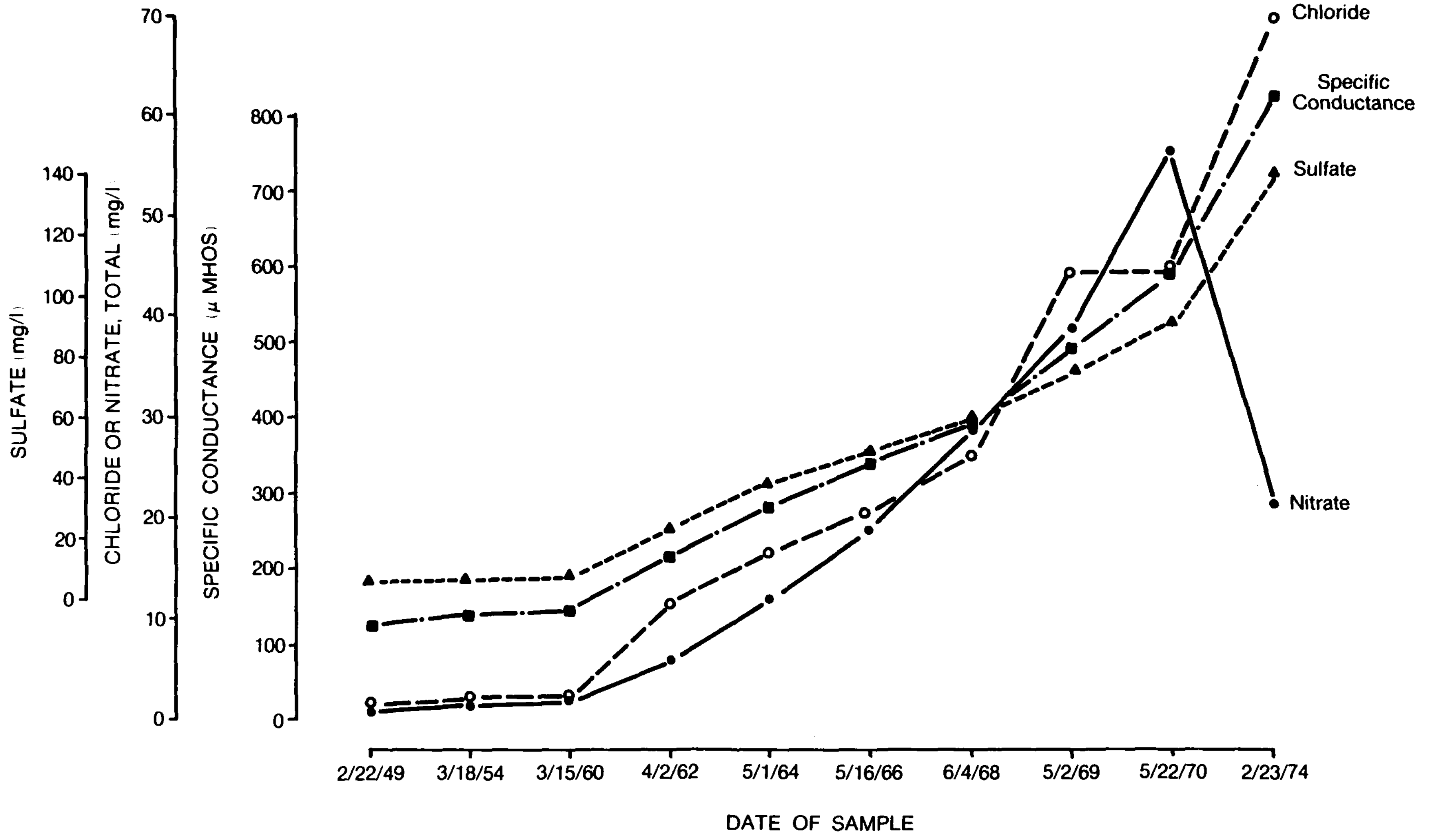

Source: U.S.G.S. Open File Report 83-39.

FIGURE 16.
Water Quality Trend at Well No. 1 (Out of Service).

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Mountain Home AFB includes 3,587 acres of land supporting desert shrub/grass vegetation with big sagebrush the dominant species. About 1,285 acres have been cleared of natural vegetation and planted to crested wheatgrass. An additional 660 acres support roads and structures. Ornamental trees and shrubs have been planted around various base facilities.

Vegetation on the 111,414-acre Saylor Creek Electronic Warfare Range consists primarily of big sagebrush with a sparse ground cover of cheatgrass, crested wheatgrass, and desert annuals. A large area of the northern part of the range burned during 1976. In this area the sagebrush has been replaced by cheatgrass. Much of the southwestern portion of the range has been seeded to crested wheatgrass.

Wildlife species occurring in the Mountain Home AFB area are typical of those associated with the Snake River Plain, with the exception of certain songbirds which utilize base ornamental plantings. Mammals found on and around the base include coyote, black-tailed jackrabbit, cottontail, Franklin's ground squirrel, and yellow-bellied marmot as well as several varieties of small rodents. Birds which commonly nest on the base include American robin, house finch, English sparrow, horned lark, starling, savannah sparrow, vesper sparrow, sage sparrow, rock dove, western meadowlark, killdeer, marsh hawk, and possibly short-eared owl. Several hundred waterfowl may use the drainage and evaporation ponds, especially during spring and fall migration. These include mallard, scaup, ringneck, ruddy duck, goldeneye, bufflehead, blue-winged teal, widgeon, and coot. A few pair of mallards may nest around the ponds. Additionally, a bank swallow colony was observed in the wall of an empty lagoon. Prairie falcons, golden

eagles, and red-tailed hawks forage in the area off the base.

Mammals occurring on the Saylor Creek Range include those listed above as well as a few muledeer and pronghorn. Big game distribution is limited by the lack of water on the range. A system of pipelines and watering troughs on the southern portion of the range may increase big game use of the area in the future. Birds which nest on the range include golden eagle, ferruginous hawk, marsh hawk, short-eared owl, burrowing owl, sage grouse, western meadowlark, horned lark, savannah sparrow, vesper sparrow, and sage sparrow. Reptiles which occur on both the base and range include prairie rattlesnake, horned toads, and several desert lizards.

2. Threatened and Endangered Species

The endangered peregrine falcon may forage either the base or the range during migration. Peregrines have been reintroduced to the Snake River Birds of Prey Natural Area 40 miles west of the range. The endangered bald eagle winters along much of the Snake River and often forages in desert areas along the river. Bald eagles may forage both the base and the range; however, the incidence of foraging would be quite low. No other threatened or endangered animals or plants are known to occur on either the base or the range.

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IV. FINDINGS

IV. FINDINGS

A. ACTIVITY REVIEW

1. Summary of Industrial Waste Disposal Practices

The majority of industrial operations at Mountain Home AFB have been in existence since the early 1940s. The base was deactivated after World War II, reopened from 1948 to 1950, again deactivated in 1950, and again reopened in 1951. Industrial operations were not conducted and therefore related wastes were not generated during periods of deactivation.

The major industrial operations include propulsion, pneudraulic, aerospace ground equipment (AGE), and corrosion control shops, and the non-destructive inspection (NDI) lab. Industrial operations generate varying quantities of waste oils, fuels, solvents, and cleaners. The total quantity of waste oils, fuels, solvents, and cleaners generated ranges from 20,000 to 40,000 gallons per year.

Standard procedures for past and present industrial waste disposal at Mountain Home AFB, based on the reports or best recollection of interviewees, are as follows:

- 1943-1945, 1948-1950, 1951-1961: Industrial wastes included waste oils, fuels, solvents, paints, and paint thinners. The majority of waste oils, solvents, paints, and paint thinners were collected in drums or bowsers and used in fire department training exercises. Fire department training areas included Sites No. 4, 5, 6, and 7. Although the principal means of waste oil disposal was

fire department training exercises, substantial amounts of waste oils were used for road oiling as a means of dust control. Road oiling was principally done at Site No. 10, a perimeter road on the western side of the base. Some waste oils and solvents were undoubtedly washed into sanitary sewers and storm drains. Some drums containing waste oils and solvents from flightline shops were also emptied at the Waste Oil Disposal Site (Site No. 9) from 1953-1956, at the Lagoon Landfill (Site No. 1) from 1954-1956, and at the B Street Landfill (Site No. 2) from 1959-1961.

Recovered fuels were either recycled back into the fuels system or used in fire department training exercises.

- <u>1961 to 1968</u>: The recycling of POL wastes by Air Froce Redistribution and Marketing was started in 1961. Waste oils, fuels, solvents, paints, and paint thinners were taken by bowser to a tank at the POL yard. The POL wastes were not segregated, and one tank received all wastes.

  POL wastes including waste fuels and commingled waste oils and solvents were also disposed of in fire department training exercises at Site No. 8, which was opened in 1962. Disposal of POL wastes by road oiling at Site No. 10 was still practiced.

- <u>1969 to present</u>: The practice of disposing of waste oils by road oiling was stopped in 1975. The disposal of POL wastes including

waste fuels and commingled waste oils and solvents in fire department training exercises was halted in 1974.

Present day disposal practices include the contracted recycling of POL wastes through the Defense Property Disposal Office (DPDO). POL wastes are stored in four underground storage tanks prior to contractor removal. Tanks are segregated as follows: waste solvents, waste synthetic oils, waste mineral oils, and waste fuels and miscellaneous petroleum products. POL wastes from most shops are taken to the POL storage tanks in bowsers. The vehicle maintenance shop stores its wastes in 800-gallon and 300-gallon underground storage tanks and the auto hobby shop stores its wastes in a 500-gallon underground storage tank prior to DPDO disposal. Some recovered JP-4 fuel is taken to the underground storage tank at the fire department training area (Site No. 8) for subsequent use in fire department training exercises.

2. Industrial Operations

The industrial operations at Mountain Home AFB have been primarily involved in the routine maintenance of the F-111A, F-111F, EF-111A, RF-4C, B-47, KC-97, and B-24 aircraft. Appendix G contains a master list of the industrial operations.

A review of base records and interviews with past and present base employees resulted in the identification of the industrial operations where the majority of industrial chemicals are handled and hazardous wastes are generated. Table 6 summarizes the major industrial operations and

Table 6
MAJOR INDUSTRIAL OPERATIONS SUMMARY

Organization/Shop/Name	Present Location (Bldg. No.)	Waste Material	Estimated Waste Quantity	Treatment/Storage/Disposal Methods 1940 1950 1960 1970 1980
366th Transportation Squadron				
Vehicle Maintenance	1100	Engine Oil Grease Antifreeze Hydraulic Fluid	1,700 gal/yr	Fire Dept., Landfill, or Dust Control[a,b,c]; DPDO[d]
		PD 680	50 gal/yr	Fire Dept. or Dust Control[a,c]; DPDO[d]
Minor Maintenance	1100	Battery Acid	520 gal/yr	Neutralized to Sanitary Sewer
Refuel Maintenance	1125	Engine Oil Grease Antifreeze Hydraulic Fluid	1,600 gal/yr	Fire Dept., Landfill, or Dust Control[a,b,c]; DPDO[d]
		PD 680	150 gal/yr	
Fire Truck Maintenance	261	Engine Oil Hydraulic Fluid Grease Antifreeze	260 gal/yr	Fire Dept., Landfill, or Dust Control[a,b,c]; DPDO[d]
366th CRS				
Electric Shop	1224	Battery Acid	550 gal/yr	Neutralized to Sanitary Sewer
		Ni/Cd Battery Fluid	60 gal/yr	To Sanitary Sewer
Small Gas Turbine Shop	1225	Engine Oil	600 gal/yr	Fire Dept., Landfill, or Dust Control[a,b,c]; DPDO[d]

[a]The primary method of POL waste disposal was in fire department training exercises.

[b]Some POL wastes were also disposed of at sites No. 1, 2, and 9 from 1953 to 1960.

[c]Some POL wastes were used in road oiling for dust control from 1955 to 1975.

[d]DPDO = Defense Property Disposal Office; previously designated Redistribution and Marketing or Salvage. Wastes taken to central storage yard for resale, recycle or disposal.

Table 6--Continued

Organization/Shop/Name	Present Location (Bldg. No.)	Waste Material	Estimated Waste Quantity	Treatment/Storage/Disposal Methods (1940–1980)
Small Gas Turbine Shop (Cont.)				
		JP-4	600 gal/yr	Fire Dept.; Fire Dept. or DPDO[d]
		PD-680 Hydraulic Fluid Carbon Remover Fingerprint Remover	600 gal/yr	Fire Dept. or Landfill[a,b]; DPDO[d]
Pneudraulic Shop	1224	PD-680 Hydraulic Fluid	200 gal/yr 400 gal/yr	Fire Dept. or Landfill[a,b]; DPDO[d]
Test Cell	1345	PD-680 Engine Oils	330 gal/yr	Fire Dept., Landfill, or Dust Control[a,b,c]; DPDO[d]
		JP-4	140 gal/yr	Fire Dept.; Fire Dept. or DPDO[d]
NDI	1222	Penetrant Emulsifier	100 gal/yr 100 gal/yr	To Sanitary Sewer; DPDO[d]
<u>366th EMS</u>				
Fuel Systems	1335	JP-4	3,600 gal/yr	Fire Dept.; Fire Dept. or DPDO[d]
Wheel and Tire	208	PD-680 Paint Stripper	960 gal/yr 660 gal/yr	Fire Dept. or Landfill[a,b]; DPDO[d]
Phase Docks	1229	JP-4 Hydraulic Fluid Engine Oil	660 gal/yr	Fire Dept., Landfill, or Dust Control[a,b,c]; DPDO[d]
Corrosion Control	1224	Thinner Paints	400 gal/yr	Fire Dept. or Landfill[a,b]; DPDO[d]

[a]The primary method of POL waste disposal was in fire department training exercises.

[b]Some POL wastes were also disposed of at sites No. 1, 2, and 9 from 1953 to 1960.

[c]Some POL wastes were used in road oiling for dust control from 1955 to 1975.

[d]DPDO = Defense Property Disposal Office; previously designated Redistribution and Marketing or Salvage. Wastes taken to central storage yard for resale, recycle or disposal.

Table 6--Continued

Organization/Shop/Name	Present Location (Bldg. No.)	Waste Material	Estimated Waste Quantity	Treatment/Storage/Disposal Methods 1940 1950 1960 1970 1980
Corrosion Control	1332	Thinner Paints	700 gal/yr	Fire Dept. or Landfill[a,b]; DPDO[d]
		PD-680 Alkali Cleaning Compound	1,800 gal/yr 3,700 gal/yr	To Sanitary Sewer
AGE	1359	JP-4	100 gal/yr	Fire dept.; Fire dept. or DPDO[d]
		Hydraulic Fluid	2,000 gal/yr	Fire Dept. or Landfill[a,b]; DPDO[d]
		Turbine Oil Engine Oil	600 gal/yr 1,300 gal/yr	Fire Dept., Landfill, or Dust Control[a,b,c]; DPDO[d]
		MOGAS	100 gal/yr	Fire Dept.; DPDO[d]
366th Support Group				
MWR Auto Hobby Shop	1340	Engine Oil	500 gal/yr	Fire Dept., Landfill or Road Oiling[a,b,c]; DPDO[d]
Base Photo Lab	1333	Fixer Solution Developing Solution	180 gal/yr 360 gal/yr	Silver Recovery of Fixer Solution; to Sanitary Sewer
Heat Plant	1328	Diesel Fuel Lubricant Oils PD-680	220 gal/yr 275 gal/yr 25 gal/yr	Fire Dept., Landfill, or Road Oiling[a,b,c]; DPDO[d]

[a]The primary method of POL waste disposal was in fire department training exercises.

[b]Some POL wastes were also disposed of at sites No. 1, 2, and 9 from 1953 to 1960.

[c]Some POL wastes were used in road oiling for dust control from 1955 to 1975.

[d]DPDO = Defense Property Disposal Office; previously designated Redistribution and Marketing or Salvage. Wastes taken to central storage yard for resale, recycle or disposal.

Table 6--Continued

Organization/Shop/Name	Present Location (Bldg. No.)	Waste Material	Estimated Waste Quantity	Treatment/Storage/Disposal Methods 1940 1950 1960 1970 1980
366th Supply Squadron				
Fuels Lab	1319	Petroleum Ether Solvents	60 gal/yr 500 gal/yr	Fire Dept. or Landfill[a,b]; DPDO[d]
		Cleaning Compound	350 gal/yr	To Sanitary Sewer

[a]The primary method of POL waste disposal was in fire department training exercises.

[b]Some POL wastes were also disposed of at sites No. 1, 2, and 9 from 1953 to 1960.

[c]Some POL wastes were used in road oiling for dust control from 1955 to 1975.

[d]DPDO = Defense Property Disposal Office; previously designated Redistribution and Marketing or Salvage. Wastes taken to central storage yard for resale, recycle or disposal.

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includes the estimated quantities of wastes generated as well as the past and present management practices of these wastes, i.e., treatment, storage, and disposal. Information on estimated waste quantities and past disposal practices is based upon information obtained from shop files and interviews with shop personnel based upon their best recollection. Descriptions of the major industrial activities are included in the following paragraphs.

a. <u>366th Transportation Squadron</u>

i. <u>Vehicle Maintenance</u>

The Vehicle Maintenance Shop is located in Building No. 1100, which was built in 1960. Prior to 1960, this shop was located in the same general area as Building No. 1100 (the old shop buildings no longer exist). Routine maintenance and major overhauls, from oil changes to body work, are performed on gasoline-powered vehicles. Wastes generated include approximately 1,700 gal/year of mixed POL, including engine oils, grease, antifreeze, and hydraulic fluids. Presently, these wastes are taken to a 800-gallon underground holding tank located between Buildings No. 1100 and 1125. A 30-gallon cleaning vat containing PD-680 cleaning solvent is used for cleaning miscellaneous parts in the shop. The vat is emptied approximately every 6 months and the waste PD 680 is taken to a 300-gallon underground holding tank located between Buildings No. 1100 and 1125. The wastes from both underground storage tanks are periodically removed by a contractor through DPDO.

In the past, these POL wastes were disposed of primarily in fire department training exercises at Sites No. 4, 5, 6, 7, and 8 through 1974. Some of the wastes were disposed of by road oiling at Site No. 10

through 1975, and by disposal at landfills (Sites No. 1, 2) and at the waste oil disposal site (site No. 9) from 1953 to 1961.

ii. Minor Maintenance

The Minor Maintenance Shop is located in Building No. 1110, which was built in 1960. Prior to 1960, this shop was located in the same general area as Building No. 1110. Routine maintenance such as brake replacement and repair is performed in this shop. Present disposal of waste acid from old batteries remains the same as in the past. Batteries are placed in a sink and neutralized with sodium bicarbonate. The neutralized electrolyte is flushed to the sanitary sewer.

iii. Refueling Vehicle Maintenance

The Refueling Vehicle Maintenance Shop is located in Building No. 1125, which was built in 1954. Prior to 1954, this shop was located in the same general area as Building No. 1125. Routine maintenance, including oil changes and tune-ups, is performed on the refueling trucks servicing the flightline. Wastes generated include approximately 1,600 gal/year of mixed POL, including engine oils, grease, antifreeze, and hydraulic fluids. Presently, these wastes are taken to a 800-gallon underground holding tank located between Buildings 1100 and 1125. About 150 gal/year of waste PD-680 is generated in cleaning operations. This waste is taken to a 300-gallon underground holding tank located between Buildings No. 1100 and 1125. The wastes from both underground storage tanks are periodically removed by a contractor through DPDO.

In the past, these POL wastes were disposed of primarily in fire department training exercises

at Sites No. 4, 5, 6, 7, and 8 through 1974. Some of the wastes were also disposed of by road oiling at Site No. 10 through 1975, and by disposal at landfills (Sites No. 1, 2), and at the waste oil disposal site (Site No. 9) from 1953 to 1961.

iv. Fire Truck Maintenance

The Fire Truck Maintenance Shop is located in Building No. 261, which is the base fire station. Building No. 261 was constructed in 1953. It is assumed that prior to 1953 the fire trucks were maintained with the general purpose vehicles. Minor maintenance is performed on the fire trucks located in Building No. 261. About 260 gallons of mixed POL, including engine oils, hydraulic fluids, grease and antifreeze are generated annually. These wastes are collected in 55-gallon drums, which are taken to DPDO for final disposition.

In the past, these POL wastes were disposed of primarily in fire department training exercises at Sites No. 4, 5, 6, 7, and 8 through 1974. Some wastes were also disposed of by road oiling at Site No. 10 through 1975, and by disposal at landfills (Sites No. 1, 2), and at the waste oil disposal site (Site No. 9) from 1953 to 1961.

b. 366th Component Repair Squadron

i. Electric Shop

The Electric Shop has been located in Building No. 1224 since its construction in 1954. The shop handles both lead acid and nickel/cadmium batteries. Present waste disposal practices remain the same as in the past. The lead acid batteries are neutralized with sodium bicarbonate, and the neutralized electrolyte then discharged

to the sanitary sewer. The electrolyte from the nickel/ cadmium batteries is discharged to the sanitary sewer. Approximately 30 nickel/cadmium batteries are processed each month.

ii. Small Gas Turbine Shop

The small gas turbine shop is located in Building No. 1225, which was built in 1973. Building No. 1225 was built on the same site as the previous building in which this shop was located.

On the average, the shop overhauls two engines per month and performs minor repairs on approximately 15 other engines. Wastes generated include about 600 gal/ year of engine oil, about 600 gal/year of recovered fuel, and about 600 gal/year of slop wastes, which include PD-680, hydraulic fluids, carbon remover, and fingerprint remover. These wastes are collected in three 55-gal bowsers located outside Building No. 1225, one each for engine oil, recovered fuel, and slop wastes. These wastes are sent to DPDO for final disposition.

In the past, these POL wastes were disposed of primarily in fire department training exercises at Sites No. 4, 5, 6, 7, and 8 through 1974. Some wastes were also disposed of by road oiling at Site No. 10 through 1975, and by disposal at landfills (Sites No. 4, 2) and at the wasate oil disposal site (Site No. 9) from 1953 to 1961.

iii. Non-Destructive Inspection (NDI)

The NDI Lab has been located in Building No. 1222, since its construction in 1972. Prior to 1972, the NDI Lab was located in Building No. 1224.

The NDI Lab handles small quantities of hazardous materials such as 1,1,1-trichloroethane, most of which are consumed in the laboratory. The lab also uses fluorescent penetrant, emulsifier, and fixer solution. Waste penetrant and emulsifier (about 100 gal/year of each) are placed in drums and disposed of through DPDO. Silver is recovered from the developing process and sent to DPDO for disposition.

iv. Pneudraulics Shop

The Pneudraulics Shop has been located in Building No. 1224 since its construction in 1954. The primary purpose of this shop is to service and repair all aircraft pneumatic and hydraulic equipment. The shop includes a 150-gallon heated cleaning vat containing PD-680 which is emptied about every 6 months. The waste PD-680 is placed in drums and taken to DPDO for disposal. Waste hydraulic fluid (400 gal/year) is collected in a bowser outside the Pneudraulic Shop and disposed of through DPDO.

In the past, these POL wastes were disposed of primarily in fire department training exercises at Sites No. 4, 5, 6, 7, and 8 through 1974. Some wastes may also have been disposed of by road oiling at Site No. 10 through 1975, and by disposal at landfills (Sites No. 1, 2), and at the wastae oil disposal site (Site No. 9) from 1953 to 1961.

v. Test Cell

The test cell is located in Building No. 1345 which was constructed in 1982. Prior to 1982, the test cell was located in Building No. 1335. The primary purpose of this shop is to test engines of the F-111A prior to reinstallation on the aircraft. Parts replacement is

also performed. Wastes generated include JP-4, engine oils, and slop wastes. Slop wastes include preserving oils, paint remover, carbon remover, and PD-680. The JP-4 is collected in a 55-gallon bowser and recycled or disposed of through DPDO. Oils and slop wastes are collected in another 55-gallon bowser, which is taken to DPDO for disposal.

In the past, these POL wastes were disposed of primarily in fire department training exercises at Sites No. 4, 5, 6, 7, and 8 through 1974. Some wastes may also have been disposed of by road oiling at Site No. 10 through 1975, and by disposal at landfill (Sites No. 1, 2), and at the waste oil disposal site (Site No. 9) from 1953-1961.

c. 366th Equipment Maintenance Squadron

i. Aerospace Ground Equipment (AGE)

The AGE shop has been located in Building No. 1359 since its construction in 1971. Prior to 1971, the AGE shop was located in Building No. 211. The AGE shop generates waste JP-4 (100 gal/year), hydraulic fluid (2,000 gal/year), turbine oil (600 gal/year), engine oil (1,300 gal/year), and MOGAS (100 gal/year). These POL wastes are collected in five individual bowsers and taken to DPDO for final disposition. Smaller quantities of PD-680 are collected in the hydraulic fluid bowser.

In the past, these POL wastes were disposed of primarily in fire department training exercises at Sites No. 4, 5, 6, 7, and 8 through 1974. Some wastes were also disposed of by road oiling at Site No. 10 through 1975, and by disposal at landfills (Sites No. 1, 2), and at the waste oil disposal site (Site No. 9) from 1953 to 1961.

ii. Fuel Systems

The Fuel Systems Shop is located in Building No. 1335. Waste JP-4 (3,600 gal/year) is collected in 50-gallon bowsers which are taken to the flightline for recycle if uncontaminated or disposal through DPDO if contaminated. Prior to 1974, the JP-4 was probably disposed of at fire department training areas, Sites No. 4, 5, 6, 7, and 8.

iii. Wheel and Tire

The Wheel and Tire Shop was relocated in 1982 to Building No. 208. Prior to 1982, this shop had been located in Building No. 1224 since its construction in 1954. Even earlier, this shop was located in Building No. 211. The Wheel and Tire Shop has one vat containing 160 gallons of PD-680 and another vat holding 110 gallons of paint remover. These vats are periodically emptied and replaced with fresh solvents. Waste PD-680 (960 gal/year) and paint remover (660 gal/year) are taken to DPDO for proper disposal. Prior to 1974, these industrial wastes were disposed of primarily at the fire department training areas, Sites No. 4, 5, 6, 7, and 8, with some disposal at landfills (Sites No. 1, 2), and at the waste oil disposal site (Site No9) from 1953 to 1961.

iv. Phase Docks

The phase docks have been located in Building No. 1229 since its construction in 1971. The primary purpose of this shop is to perform scheduled maintenance on the aircraft. The phase docks generate POL waste (660 gal/year) consisting of hydraulic fluid, engine oil, and fuel. The waste is placed in a drum and taken to DPDO for proper disposal.

In the past, these POL wastes were disposed of primarily in fire department training exercises at Sites No. 4, 5, 6, 7, and 8 through 1974. Some of the wastes were also disposed of by road oiling at Site No. 10 through 1975, and by disposal at landfills (Sites No. 1, 2), and at the waste oil disposal site (Site No. 9) from 1953 to 1961.

v. Corrosion Control

Corrosion control is located in two shops, one in Building No. 1224 and the other in Building No. 1332. The purpose of the shop in Building No. 1224 is to paint aircraft parts and AGE equipment. This shop has been located in Building No. 1224 since its construction in 1954. Activities include cleaning, sanding, wiping, priming, and painting. Wastes generated (400 gal/year) include primers, thinners, paints, and solvents such as MEK. The wastes are collected in a container and taken to DPDO for proper disposal. The purpose of the shop in Building No. 1332 is to wash and/or paint aircraft. Approximately 7 to 10 planes are painted each month. This shop has been located in Building No. 1332 since its construction in 1955. Activities include washing, cleaning, sanding, wiping, priming, and painting. Materials used include PD-680 (1,800 gal/year) and alkaline cleaning compound (3,700 gal/year). Most of these materials are discharged with the washrack wastewater, which goes to an oil/water separator before discharge to the sanitary sewer. Other industrial wastes (700 gal/year) include paints, thinners, and smaller quantities of solvents such as MEK and toluene. These are collected in 55-gallon drums and disposed of through DPDO.

In the past, these POL wastes were disposed of primarily in fire department training exercises at Sites No. 4, 5, 6, 7, and 8 through 1974 with some disposal at landfills (Sites No. 1, 2), and at the waste oil disposal site (Site No. 9) from 1953 to 1961.

d. 366th Combat Support Group

i. MWR Auto Hobby Shop

The MWR Auto Hobby Shop has been located in Building No. 1340 since its construction in 1961. Prior to 1961, this shop was located in a building whose approximate location was between 1st and 2nd Avenues, and A and B Streets. This building no longer exists. About 500 gal/year of waste oil is generated and collected in a 500-gallon underground storage tank, which is periodically emptied by a DPDO contractor. Prior to 1975, this waste oil was disposed of by road oiling at Site No. 10.

ii. Base Photo Lab

The Base Photo Lab has been located in Building No. 1333 since its construction in 1955. Prior to 1955, this lab was located in Building No. 516, constructed in 1953. It is assumed that this lab has been in existence since the inception of the base, but exact location of this lab prior to 1953 is unknown. Wastes generated include fixer solution (180 gal/year) and developer solution (360 gal/year). These wastes are discharged in the sanitary sewer. Silver recovery of the fixer solution is practiced prior to discharge to the sanitary sewer.

iii. Base Heating Plant

The coal-fired heating plant has been located in Building No. 1328 since its construction in 1955. Wastes generated include diesel fuel (220 gal/year), lubricant oils (275 gal/year), and PD-680 (25 gal/year). These POL wastes are collected in containers and taken to DPDO for disposal. In the past, these POL wastes were disposed of primarily in fire department training exercises

at Sites No. 4, 5, 6, 7, and 8 through 1975. Some wastes were also disposed of by road oiling at Site No. 10 through 1975, and by disposal at landfills (Sites No 1, 2), and at the waste oil disposal site (Site No. 9) from 1953 to 1961. Fly ash residue is disposed of on the ground surface at the B Street Landfill (Site No. 2).

e. 366th Combat Supply Squadron

i. Fuels Lab

The fuels lab has been located in Building No. 1319 since its construction in 1971. Materials used include petroleum ether (60 gal/year), solvents (500 gal/year), and cleaning compound (350 gal/year). Waste petroleum ether and solvents are collected and disposed of through DPDO. The cleaning compound is discharged to the sanitary sewer.

3. Fuels

The main bulk storage facility for JP-4 is at the POL yard and consists of three above-ground, earth covered, steel storage tanks, each having a capacity of 36,260 barrels (approximately 1.5 million gallons). In addition, three 50,000-gallon buried steel storage tanks are located at the South Fuel Pump Station at the southeast end of the aircraft parking apron. These intermediate storage tanks are supplied from bulk storage and provide fuel to the three fuel hydrants located at the southeast end of the apron. Nine additional flush hydrant refueling outlets are located near the center of the parking apron and are supplied directly from bulk storage by hydrant pumps and pipelines. Twelve aircraft defueling pits are also located adjacent to each flush hydrant. A 50,000-gallon defueling storage tank (underground) is located next to defueling pit No. 4.

The major active JP-4 tanks are cleaned infrequently because of the low humidity and the resulting low accumulation of water and rust in the bottoms of the tanks. When cleaned, the bottom sludge, consisting of small quantities of rust, sediment, and water with some residual fuel, is taken to a landfill, allowed to weather on the ground surface for several weeks, and then turned under. Interviewees indicated that tank cleaning sludge has been disposed of in the above manner at the B Street Landfill (Site No. 2), but has not been disposed of to date at the existing landfill (Site No. 3). Interviewees also indicated that larger quantities of AVGAS tank sludge were disposed of at the time of the conversion of the main AVGAS storage tanks to diesel storage tanks. This sludge would have gone to the B Street Landfill.

Residual JP-4 from aircraft wing tanks and defueling of aircraft is tested and, if uncontaminated, is recycled and reused in aircraft. Waste JP-4 is transported to one of the four underground storage tanks (15,000 gallons each) and sold to a recycling contractor through the Defense Property Disposal Office (DPDO). The four waste POL tanks are located at the POL yard and waste POL is segregated as follows: waste solvents, waste synthetic oils, waste mineral oils, and waste fuels and miscellaneous petroleum products. Some waste JP-4 is also taken to the underground 15,000-gallon tank at the fire department training area for subsequent use in fire department training exercises. In the past, 1950s and 1960s, some waste fuel and also commingled waste oils and solvents were used for road oiling for dust control on a portion of the dirt perimeter road (Site No. 10). Further discussion of Site No. 10 is given in Section IV.B.

Numerous other fuel storage tanks containing diesel fuel, MOGAS, JP-4, and deicing fluid are located at

several areas throughout the base. An inventory of POL storage tanks, including location, capacity, and type of POL stored, is included in Appendix H.

The soils at Mountain Home AFB are classified as having little to slight potential for corrosion. Inventories of major fuel storage tanks have generally shown a fuel balance of within 0.5% in the system. Cathodic protection is also provided for all major fuel transport lines. In general, leaks from tanks or fuel lines as a result of corrosion have not been a problem at Mountain Home AFB. A major leak did occur in the late 1950s when a vent line on the fuel transport line supplying the flush hydrant system ruptured due to non-corrosion related mechanical failure. This main fuel transport line is located under the center portion of the aircraft parking apron and is enclosed in a corrugated steel conduit. A discrepancy in the fuel system inventory caused the initial concern for a possible leak. The fuel line leak was discovered by breaking through the paved apron area with a jack hammer. The vent line located on the fuel transport line about midway across the apron had ruptured and spilled fuel into the corrugated steel conduit. At the time of the investigation, the conduit was found to be half full of fuel. Some fuel leaked out of the culvert and the surrounding sub-base material was fuel saturated. The exact quantity of fuel lost is not known for certain but could be large, as much as 50,000 gallons. A major fuel spill also occurred in this same general area in the late 1950s when the defueling storage tank located next to defueling pit No. 4 overflowed resulting in an estimated 14,000 gallons of fuel spilled onto the ground surface behind the apron. The general area of the fuel line leak and the fuel tank spill is referred to as Site No. 11 and is discussed further in Section IV.B. Miscellaneous small spills have occurred along the flightline area due to venting of aircraft fuel tanks and overtopping of fuel

storage tanks. However, no major fuel leaks or spills, other than Site No. 11, were reported or observed at Mountain Home AFB.

An estimated six inactive POL storage tanks are located at Mountain Home AFB based on the best recollection of several of the interviewees. The location, capacity, and type of POL stored in the tanks are summarized in Appendix I. These tanks have reportedly been capped off but may still contain POL products.

4. Fire Department Training Activities

Fire department training activities have been common at Mountain Home AFB since 1943. Prior to 1975, primarily waste fuels and some (about 10%) waste oils and solvents were burned at the training sites. Since 1975, only JP-4 has been used. The training exercises were conducted in cleared, circular, earthen-bermed areas using mock aircraft. The exercises were conducted approximately twice per week prior to 1975 using 200 to 300 gallons of POL wastes per exercise. Since 1975, the frequency of fire department training exercises has been reduced to approximately twice per month. Protein foam and water were predominantly used to put out the fires, prior to about 1972. Since 1972, an agent referred to as "Aqueous Film-Forming Foam (AFFF)" has been used in major fire department training exercises. AFFFs are non-corrosive, biodegradable, fluorocarbon surfactants with foam stabilizers and do pose a potential for environmental stress through oxygen depletion. A brief description of past and present fire department training activities at Mountain Home AFB is given below. Further discussion of the fire department training areas is given in Section IV.B.

- <u>1943-1944</u>: The original fire department training area (Site No. 4) was located just west of Main Avenue and north of the 4500 family housing area. POL wastes, mostly waste fuels, were brought to the training area in 55-gallon drums. The contents of the drums were poured onto a mock aircraft just prior to the exercises and burned.

- <u>1944-1945</u>: This second fire department training area (Site No. 5) was used for a brief time and was located at the site of the existing base supply warehouse (Building No. 1325). As with the first site, POL wastes were transported to the site in 55-gallon drums and poured onto the area just prior to the burning exercises.

- <u>1948-1950, 1951-1953</u>: Fire department training exercises during this time were conducted periodically in an area (Site No. 6) which was located near the flight line southwest of Building No. 1364. The same general procedures were used as for the first two fire department training areas.

- <u>1953-1962</u>: Fire department training exercises during this time were routinely conducted in two adjacent circular areas (Site No. 7) located on each side of the abandoned east-west runway (Facility 31024). Procedures were the same as for the above fire department training areas.

- <u>1962-present</u>: Since 1962, fire department training exercises have been conducted at the existing facilities (Site No. 8) southeast of the power check pads near taxiway "B." POL wastes including waste fuels and commingled waste oils and solvents were used prior to 1975. Since 1975,

only JP-4 has been used. A 15,000-gallon underground storage tank was installed in 1975 to store the JP-4. Procedures used at this fire department training area include pre-saturation of the area with water prior to introduction of the waste POL or JP-4, and post-ignition of the area after the exercise to burn off residual fuel.

5. Polychlorinated Biphenyls (PCBs)

The main source of PCBs at Mountain Home AFB is electrical transformers. There are approximately 600 in-service transformers at Mountain Home AFB. A program is currently underway to test all of the in-service transformers for PCB content. Transformers which are identified as PCB items will be properly labelled, inspected, and properly stored and disposed of when taken out of service.

Protective storage for PCB items and PCB-contaminated items is provided in Building No. 1808, a concrete building with a concrete floor and no floor drains. Currently, there are no PCB or PCB-contaminated items in storage. Several items were recently disposed of through the Defense Property Disposal Office (DPDO), including three PCB transformers that were taken out of service from the base hospital, and eight electromagnetic capacitor filter units that were taken out of service from the telecommunications center in Building No. 1506. One of the filter units had a small leak but the residue was contained in the filter unit mounting box.

In the past, out-of-service transformers (5 to 10 per year) were taken to DPDO for final disposition. Transformer oil was not drained from the transformers. There is no record and no verbal reports of any major PCB spills from leaking or blown transformers or during the

handling of any PCB materials. There were no reports or indication of out-of-service transformers or capacitors being disposed of in base landfills in the past.

6. Pesticides

Pesticides are commonly used at Mountain Home AFB for weed and pest control. Pesticides have been stored in the Entomology Shop (Building No. 2206) since the late 1960s. Prior to that time, there was no central storage location although some pesticides were stored at the water treatment plant. Pesticides used for control of roaches, ants, aphids, army worms, caterpillars, earwigs, and other pests include Diazinon, Malathion, Sevin, Baygon, Ficam W, Dursban, and Chlordane (termite control only). Warfarin and anticoagulants are used for rodent control. Herbicides used for the control of weeds and brush include Ouncmherb, Pramitol, Tersan, and 2,4-D. The major herbicides and other pesticides used at Mountain Home AFB during the past year are Ouncmherb (33,642 lb); 2,4-D (258 lb); Diazinon (1,197 lb); Sevin (10 lb); and anticoagulant (11 lb). Proper preparation and application procedures are followed. Empty pesticide containers are triple rinsed, punctured with holes, and disposed of in the base landfill.

In general, all pesticides were consumed in use in the past and, with the exception of DDT, there were no reports of unused pesticides disposed of in landfills or burial sites. In the early 1970s, after the ban on DDT, it was reported that the remaining DDT stock (10-20 drums) was disposed of at the old B Street Landfill (Site No. 2). The DDT drums were reportedly placed in a landfill trench and possibly burned. The exact location of the trench at the B Street Landfill site which received the DDT is not known. Further discussion of the B Street Landfill is given in Section IV.B.

A concrete drainage ditch inside the Entomology Shop previously drained to the ground surface outside the building. This drainage ditch was used to collect washwater from the cleaning of pesticide application equipment. In 1981, water samples around the building (puddled water after a prolonged period of rainfall) were collected and analyzed for pesticides. Positive results were found for several pesticides including low concentrations of DDT and Chlordane (see Section IV.A.8 for further discussion of results). An underground tank was subsequently installed to collect the washwater and prevent further contamination of the ground surface. The contents of the tank are analyzed prior to the selection of an appropriate disposal procedure. To date, the tank contents have been disposed of only once by application to an abandoned runway area for weed control after an analysis indicated the presence of the herbicide Pramitol at a low concentration.

The extent of the soil column contamination around the Entomology Shop is not known and there is some concern that pesticides may enter a nearby drainage ditch. Further discussion of the pesticide contaminated area (Site No. 12) is given in Section IV.B.

7. Wastewater Treatment

The sanitary and industrial wastewater from Mountain Home AFB is treated in a 4-unit, 72.8-acre lagoon system. The primary lagoon system (Lagoons No. 1, 2, and 3) were constructed in 1961-1962. An additional lagoon (Lagoon No. 4) was added in 1971. The lagoons provide oxidation pond treatment and operate at an average depth of 3.5 feet with a maximum depth of 4 feet. A description of the lagoon system is given below:

Lagoon No.	Area (acres)	Volume (million gallons)
1	16.7	19.0
2	20.5	23.4
3	25.0	29.6
4	10.6	12.0
TOTAL	72.8	84.0

Two ground infiltration ponds (percolation ponds) were constructed to dispose of lagoon overflow, especially during wintertime months when evaporation from the lagoon surface decreases. An additional infiltration pond was constructed in 1976. Total area of the infiltration ponds is approximately 14 acres.

Final disposal of the effluent is by evaporation and percolation from the lagoons and infiltration ponds. No sewage effluent discharge leaves the base; therefore, no National Pollutant Discharge Elimination System (NPDES) permit is required.

Current average daily flow to the treatment system is about 800,000 gpd. Water balance calculations conducted by OEHL of evaporation and influent flow indicate that the capability of the system to dispose of effluent without discharge from the base is being stressed, and OEHL suggested that additional retention capability may be required in the future if flows increase. Water quality analyses of the influent and effluent (overflow to the infiltration ponds) indicate good treatment performance and good effluent quality (see Section IV.A.8 for further discussion of water quality).

During the records search investigation, it was discovered that Lagoons No. 2 and 3 were constructed over an old landfill (Site No. 1), thereby providing a potential driving force for leachate generation and migration from this landfill. Further discussion of Site No. 1 is given in Section IV.B.

Prior to 1961, the wastewater from the base was treated in a primary treatment plant constructed in 1942. Treatment consisted of primary clarification, anaerobic sludge digestion, and sludge drying beds for dewatering. The effluent was discharged to a drainage ditch (still existing) which leaves the base at the western boundary.

There are 10 oil/water separators connected to the sanitary sewer system which provide pretreatment to various industrial shop discharges (Buildings No. 195, 1228, 2304, 1100, 2316, 1349, 1125, 1359, 2209, and 2427). There are an additional 12 oil/water separators connected to the storm drainage system (Buildings No. 1340, 1347, 1335, 211, 208, 205, 204, 1341, 1100, and 261). Most of these oil/water separator pretreatment facilities were installed in the 1970s. The oil/water separators are inspected monthly and maintained by base civil engineering staff. Waste POL from the separators is periodically pumped out and deposited in the waste storage tanks located at the POL yard. When the contents of the separators have been dilute (mostly water), they have been disposed of on the ground surface at the sanitary landfill (Sites No. 2 and 3). Sediments are removed periodically from the oil/water separators and have been disposed of at the sanitary landfill (Sites No. 2 and 3).

Storm drainage is normally pumped from behind McCully Dam into the wastewater treatment lagoon system. However, during wet-weather periods, the dam is occasionally bypassed and the drainage flows off-base into a gully which eventually drains into Canyon Creek. This creek drains into the Snake River which is approximately 2 miles from the base. Analyses are normally conducted when discharge of any stormwater is necessary (see Section IV.8 for further discussion of storm drainage water quality).

8. Available Water Quality Data

There are six potable water supply wells at Mountain Home AFB (Figure 11, page III-17). Treatment consists of fluoridation and chlorination prior to distribution. The base water supply wells are analyzed every 3 years for heavy metals and pesticides. Recent results show that all of the water supply wells meet primary drinking water standards for heavy metals and pesticides. Recent sampling for trichloroethylene (TCE) showed that TCE levels in all base wells are less than 0.1 parts per billion (ppb). The only apparent water quality problem is nitrate, which is generally present at elevated levels (30-40 mg/l) in Well No. 3. Possible sources for the elevated nitrate levels in Well No. 3 include nitrate fertilizer from the nearby golf course and possible exfiltration from nearby sewage lines. The absence of bacterial contamination in Well No. 3 as well as the fact that nitrogen in raw sewage would be present as ammonia or organic nitrogen, not nitrate nitrogen, indicate that contamination of this well by raw sewage is unlikely. A more likely source of the contamination would be nitrate fertilizer from the golf course. Excess nitrate would tend to leach down to the hardpan layer and could possibly migrate toward the well. A faulty well casing would provide a pathway for this leaching nitrate to enter the well. It should be noted that water from Well No. 3 is blended with other well waters such that the nitrate nitrogen content of the blended water is below 10 mg/l, which is the primary drinking water standard maximum contaminant level for nitrate nitrogen.

The base sewage is treated in a four-unit, 72.8-acre lagoon system. Final effluent disposal is by evaporation/percolation from the lagoons, or overflow into

three infiltration ponds. No sewage effluent flows off the base. The treatment lagoon system influent and effluent (overflow to the infiltration ponds) are analyzed periodically for biochemical oxygen demand (BOD_5), nitrate nitrogen, total kjeldahl nitrogen, oil and grease, total phosphorus, pH, and chromium. Recent results show good treatment performance and good quality effluent. No chromium was detected in the lagoon influent or effluent.

The base storm drainage system includes open storm ditches and underground concrete storm drains. Most of the base drainage flows to a large drainage ditch which leaves the base property at the western boundary near the base sewage treatment lagoons. A small collection dam, called McCully Dam, has been installed in the ditch and storm drainage is normally pumped from behind the dam into sewage treatment lagoon No. 3, as required. Most of the time, this drainage ditch is dry. Occasionally, during periods of heavy or prolonged rainfall, the drainage is allowed to bypass the collection dam and flow off the base. Water quality analyses are normally taken when any offbase discharge of collected drainage occurs. Analyses generally include oil and grease, cadmium, chromium, iron, lead, and surfactants. Recent test results show low levels of oil and grease and no heavy metals. Fecal coliform analyses have shown high counts; however, a special test (fecal coliform to fecal streptococci ratios) indicates that the fecal coliform is from non-human origin and not the result of sewage contamination.

Pesticide sampling has been done in and around the current Entomology Shop (Building No. 2206). This investigation was conducted after it was discovered that an open concrete floor drain inside the building was discharging on the ground surface outside the building. The concrete floor

drain received washwater from the cleaning of pesticide application equipment. On May 18, 1981, the base bioenvironmental engineering staff collected air samples from inside Building No. 2206, as well as soil and water samples at several locations around the building. The sampling was done after a period of prolonged rainfall and the water samples were taken from puddled areas outside the building. The air samples were found to be acceptable. Malathion, diazinon, and chlordane were below threshold limit values and in fact below detectable limits. A number of pesticides were found in the water samples. A scan of 23 pesticides indicated the presence of low to moderate levels (.005 to 0.5 mg/l) for aldrin, dieldrin, endrin, heptachlor, heptachlor epoxide, lindane, chlordane, DDT, DDD, DDE, beta-BHC, and delta-BHC. Sevin and Baygon were also found at relatively higher levels (1.1 to 8.5 mg/l); however, these pesticides are biodegradable and should pose no adverse environmental impact. In general, the highest levels of aldrin, dieldrin, etc., were found in the vicinity of the concrete drainage ditch discharge. The highest levels of Sevin and Baygon were found in the vehicle parking area. The soil samples also gave positive results for several pesticides. In general, low levels were found for Chlordane, Dieldrin, DDD, DDE, DDT, Toxaphene, Sevin, Baygon, Diazinon, Methoxychlor, and Heptachlor, primarily in soil samples collected along the drainage ditch discharge. An exception was a high Diazinon level (11,850 micrograms/gram) which was found in a soil sample collected at the equipment parking area. Further discussion of the Entomology Shop area is given in Section IV.B.

9. Other Activities

The review of the records and information obtained during the interviews produced no evidence of the past or present storage, disposal, or handling of biological or chemical warfare agents at Mountain Home AFB.

Some small scale explosive ordnance disposal (EOD) activities are conducted at Mountain Home AFB. A burn pit and burn kettle facility are located in an area northwest of and adjacent to the munitions storage area. Small items such as small arms rounds, survival flares, and aircraft egress cartridges are deactivated in the burn kettle using a small amount of diesel fuel. The burn pit is used for flares that may leave a metal slag inside the kettle or for large amounts of small arms rounds. A layer of dunnage and the items to be disposed of are placed in the burn pit and ignitied with a small amount of diesel fuel. The pit is covered with a metal mesh grating during burning. The inert residue from both the burn kettle and burn pit is placed in a 55-gallon drum and transported to the active ordnance burial site at the Saylor Creek Electronic Warfare Range. Any larger items that require deactivation or detonation are also taken off-base to the Saylor Creek Electronic Warfare Range. The on-base EOD burn facilities are used approximately once every 3 months. EOD proficiency training is conducted once per month at the Small Arms Range. Only small quantities of explosives (5-lb limit) are used in the training exercises. No inert residue burial sites are known to exist at the Small Arms Range.

The records search indicated that trichloroethylene (TCE) had been used in small quantities in the past as a general wipe solvent. The TCE would have been consumed in use (evaporated) or commingled with waste oils. There were no reports of large-scale use or spills of TCE having occurred in the past.

B. DISPOSAL SITES IDENTIFICATION AND EVALUATION

Interviews with 42 past and present base personnel (Appendix C) resulted in the identification of 17 disposal and spill sites at Mountain Home AFB. The approximate

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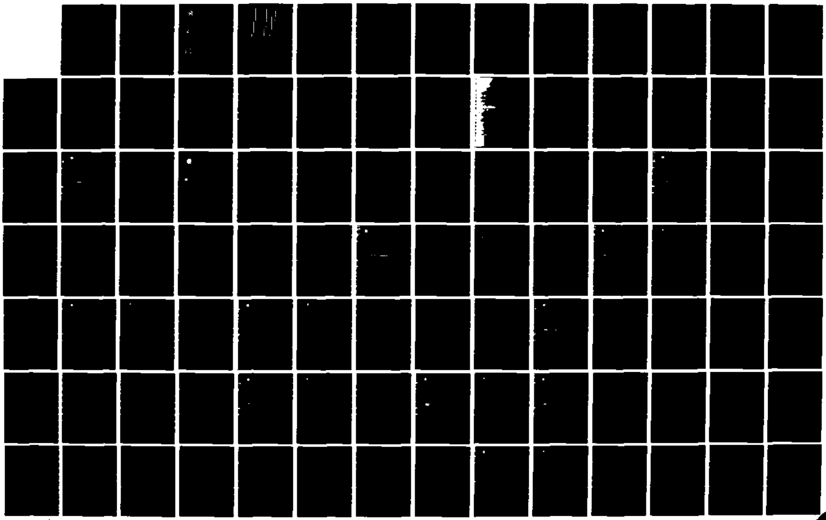
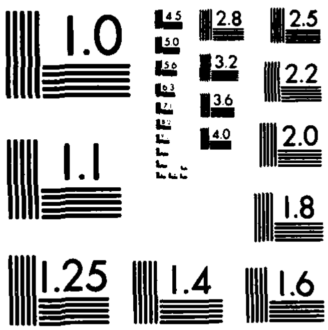
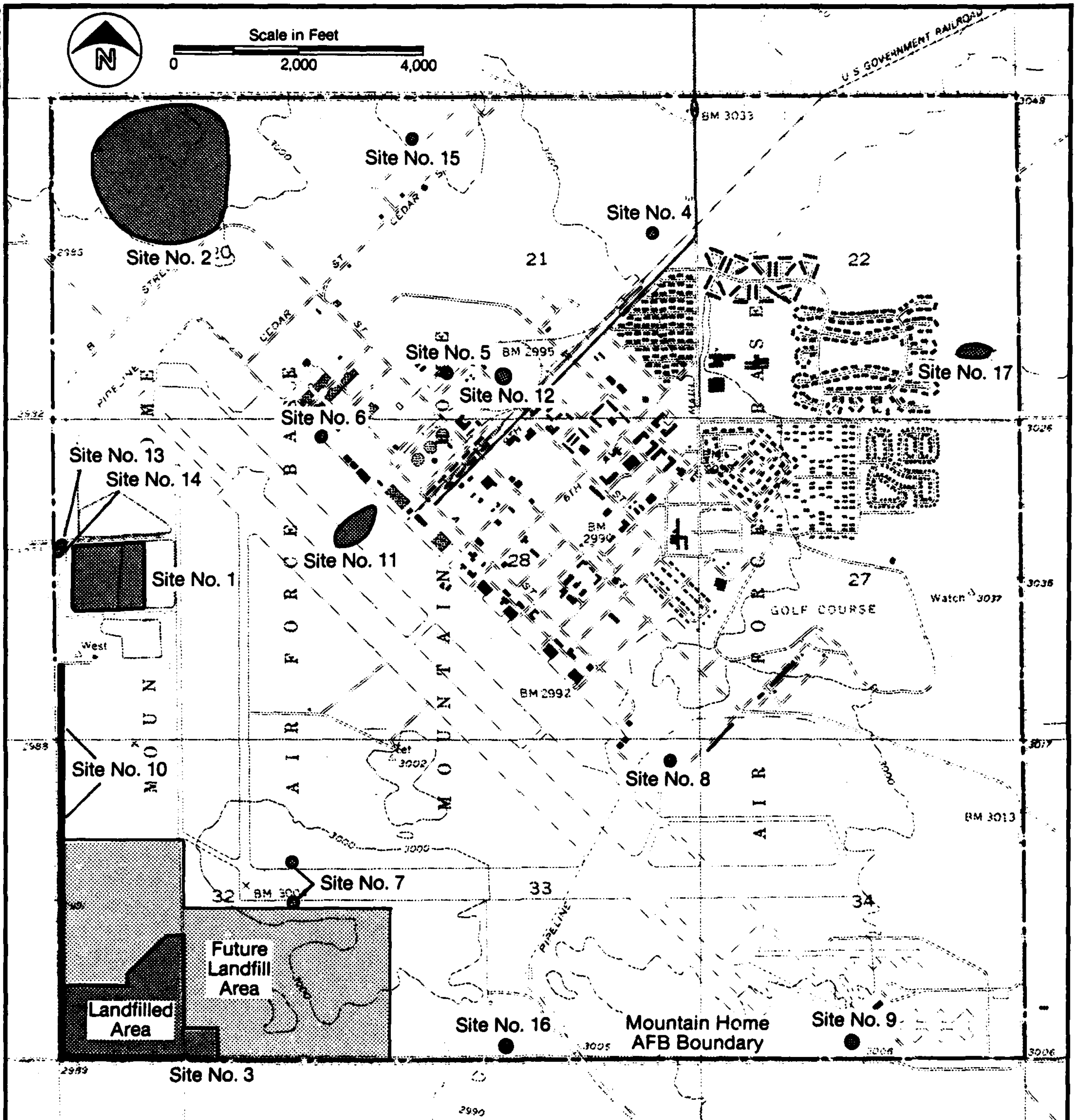




locations of these sites are shown on Figure 17 (page IV-32). A summary of the approximate dates that the major sites were active is given on Figure 18 (page IV-33).

A preliminary screening was performed on all 17 identified past disposal and spill sites based on the information obtained from the interviews and available records from the base and outside agencies. A summary of sites, including potential hazards, is given in Table 7. Using the decision tree process described in Section I.E., pages I-6 and I-7, based on all of the above information, a determination was made whether a potential exists for hazardous material contamination in any of the identified sites. For those sites where the potential for hazardous material contamination was identified, a determination was made as to whether a potential exists for contaminant migration from these sites. The sites where the potential for migration exists were then rated using the U.S. Air Force Hazard Assessment Rating Methodology (HARM), which was developed jointly by the Air Force, CH2M HILL, and Engineering-Science for specific application to the Air Force Installation Restoration Program. The HARM system considers four aspects of the hazard posed by a specific site: the waste and its characteristics, the potential pathways for waste contaminant migration, the receptors of the contamination, and any efforts to contain the contaminants. Each of these categories contains a number of rating factors that are used in the overall hazard rating. A more detailed description of the HARM system is included in Appendix D. Definitions of large, medium, and small quantities of hazardous wastes are also included in Appendix D. Copies of the completed rating forms are included in Appendix J.

The following is a description of each site, including a brief discussion of the rating results.



LEGEND

Site No. 1—Lagoon Landfill
Site No. 2—B Street Landfill
Site No. 3—Existing Landfill
Site No. 4—Fire Dept. Training Area No. 1
Site No. 5—Fire Dept. Training Area No. 2
Site No. 6—Fire Dept. Training Area No. 3
Site No. 7—Fire Dept. Training Area No. 4
Site No. 8—Existing Fire Dept. Training Area
Site No. 9—Waste Oil Disposal Site
Site No. 10—Perimeter Road
Site No. 11—Fuel Hydrant System Leak/Spill Area
Site No. 12—Entomology Shop Yard
Site No. 13—Low-Level Radioactive Material Burial Site
Site No. 14—Corker Material Burial Site
Site No. 15—Munitions Residue Burial Site
Site No. 16—Used Tire Disposal Site
Site No. 17—Old Burial Trench

FIGURE 17.
Location Map of Identified Disposal and Spill Sites at Mountain Home AFB, Idaho.

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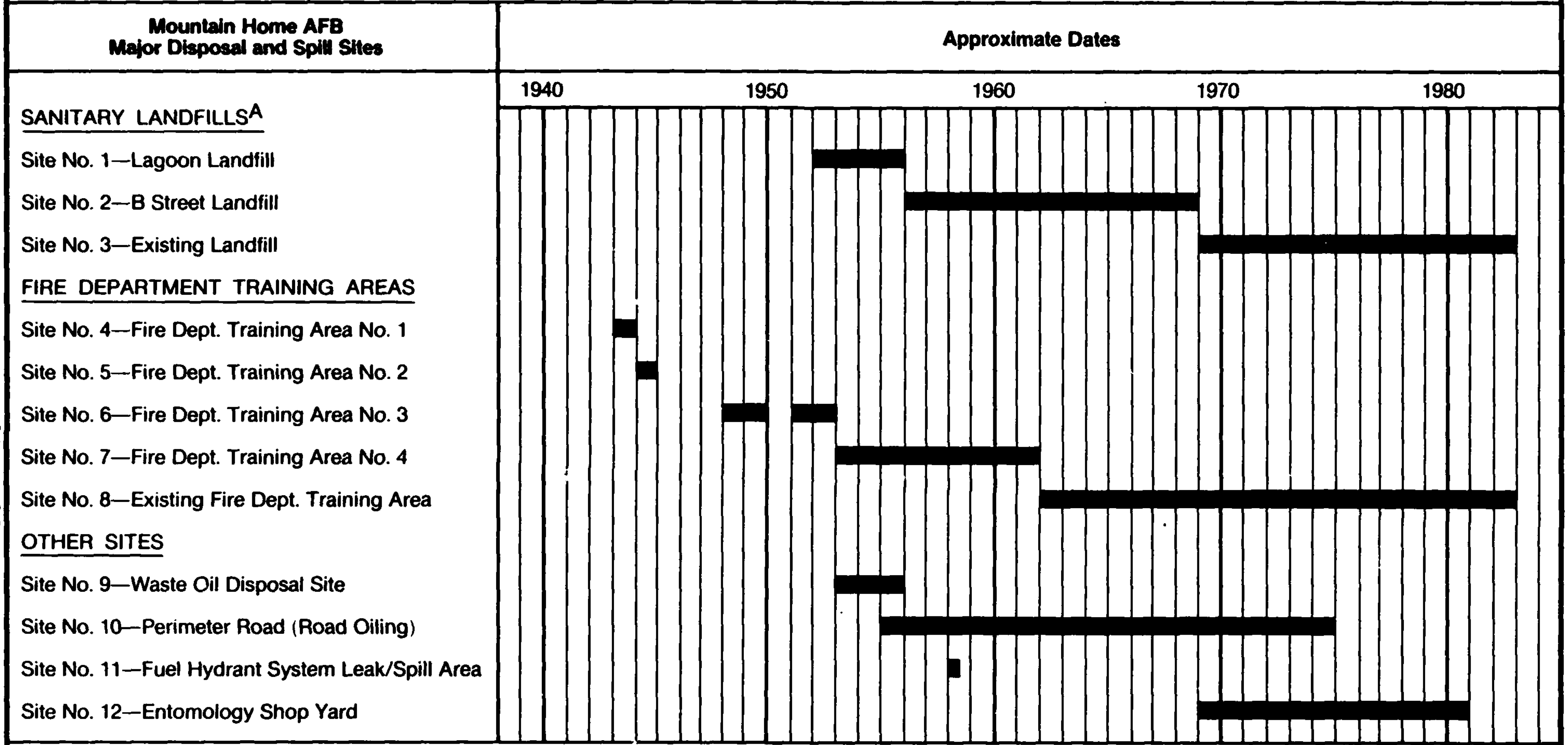

A: Prior to 1952, base refuse was hauled off base to a sanitary landfill located at Grand View Highway.

Note: The base was deactivated between 1945 and 1948, and again between 1950 and 1951.

FIGURE 18.
Historical Summary of Activities at Major Disposal and Spill Sites at Mountain Home AFB, Idaho.

Table 7
DISPOSAL SITE SUMMARY

Site No.	Site Description	Waste Type	Potential Hazard Contamination	Potential Hazard Migration	Potential Hazard Rating
1	Lagoon Landfill	POL, municipal and industrial wastes, solvents	Yes	Yes	Yes
2	B Street Landfill	POL, municipal and industrial wastes, solvents, AVGAS/JP-4 tank sludges, DDT	Yes	Yes	Yes
3	Existing Landfill	Municipal wastes, POL	Yes	Yes	Yes
4	Fire Department Training Area No. 1	POL, solvents	Yes	Yes	Yes
5	Fire Department Training Area No. 2	POL, solvents	Yes	Yes	Yes
6	Fire Department Training Area No. 3	POL, solvents	Yes	Yes	Yes
7	Fire Department Training Area No. 4	POL, solvents	Yes	Yes	Yes
8	Existing Fire Department Training Area	POL, solvents	Yes	Yes	Yes
9	Waste Oil Disposal Site	POL	Yes	Yes	Yes
10	Perimeter Road	POL	Yes	Yes	Yes
11	Fuel Hydrant System Leak/Spill Area	Aircraft fuel	Yes	Yes	Yes
12	Entomology Shop Yard Site	Pesticides, herbicides, insecticides	Yes	Yes	Yes
13	Low-Level Radioactive Material Burial Site	Low-level radioactive wastes	Yes	No	No
14	Corker Material Burial Site	Aircraft composite material	No	No	No
15	Munitions Residue Burial Site	Munitions casings	No	No	No
16	Used Tire Disposal Site	Used tires	No	No	No
17	Old Burial Trench	Outdated supplies and munitions	Yes	No	No

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1. Landfills

Sanitary landfill sites at Mountain Home AFB have been in use since the reactivation of the base in 1951. Prior to 1951, an off-base site not on government property was the main sanitary landfill. This site was located about 2 miles southwest of the base just off Grand View Highway (State Highway 67). Landfill excavations have breached the low-permeability soil layer, thereby increasing the potential for vertical migration of contaminants. Three landfill sites located on the base are described below.

- Site No. 1, designated the Lagoon Landfill Site, is located on the west side of the base. In 1961-62, wastewater lagoons No. 2 and 3 were built on top of this site, which had previously been used as a sanitary landfill.

  This site served as the main base sanitary landfill for approximately 4 years from 1952-56. The landfill received general refuse and POL products. General refuse was placed in trenches and burned. An area within the trenches was reserved for the dumping of POL products, primarily from the engine shop and the AGE shop. POL products included mineral oils, hydraulic fluids, engine oils, and solvents. About 6 drums/month of POL products were emptied at this site. Smaller quantities of hazardous materials including trichloroethylene and carbon tetrachloride were also placed in this landfill.

The overall rating for Site No. 1 was 70, the highest of all rated sites. The pathways subscore of 100 was mainly responsible for this high rating. This was a result of the high flooding migration potential due to the fact that the wastewater lagoons are directly above the landfill. Due to its remoteness, Site No. 1 is considered to have a lower priority than its assessment rating would indicate.

- Site No. 2, designated the B Street Landfill, is located at the northwest end of B Street. This area served as the main base sanitary landfill from 1956 until 1969, when the existing landfill was opened.

  This landfill has received both general refuse and industrial wastes. General refuse included garbage, metal shelving, concrete rubble from building demolition, empty 55-gallon drums, and trees uprooted during construction. Industrial wastes included waste oils from the motor pool and flightline and fly ash from the heat plant. Some flightline POL wastes, including waste oils and solvents, were also reportedly disposed of at this area for a short time during the early 1960s. Refuse and wastes were placed in shallow trenches about 12-14 feet deep. Burning of materials was reported by several interviewees, although cover operations may have also been practiced. Both JP-4 and AVGAS tank cleaning sludges have been disposed of at this site. Further discussion of tank cleaning sludges is given in Section IV.A.

In 1969, the use of DDT at Mountain Home AFB was halted. The remaining drums were placed in the B Street Landfill. The number of drums was reported by one interviewee as between 10 and 20. The exact location of the burial trench is not known.

The overall rating for this site is 57. The receptors subscore of 57 is due mainly to the site's proximity to an off-base well (approximately 2,000 feet). The waste characteristics subscore (80) is due primarily to a high hazard rating and a medium quantity of wastes. The pathways subscore is low (35) due to a low driving force for contaminant migration.

- Site No. 3 is the Existing Landfill and is located at the southwest corner of the base.

  This site has served as the main base sanitary landfill since 1969. Trenches are cut 20 to 25 feet deep, 400 feet long, and 100 feet wide. The landfill is operated trench and fill with no burning permitted. Two trenches, one for wood and metals, the other for household refuse, are currently used.

  Unlike Sites No. 1 and 2, no interviewee stated positively that POL wastes were placed in this site. Recycling of POL wastes by DPDO began at about the time this landfill was opened. It is suspected that disposal of POL wastes occurred at this site when it first opened, but the quantity of POL wastes

diminished to zero as the recycling program became established.

The overall rating score for this site is 40. The receptors subscore of 51 is due primarily to the site's proximity to base Well No. 5 (approximately 5,000 feet). The waste characteristics subscore of 40 is due mainly to the fact that small quantities of hazardous wastes are only suspected to have been disposed of at this site. The pathways subscore (28) is relatively low due to the depth to the ground-water aquifer and low net precipitation producing a small driving force for contaminant migration.

2. Fire Department Training Areas

- Site No. 4 is the location of the original fire department training area. This site, used from 1943-1944, was situated just west of Main Avenue and north of the 4500 family housing area. POL wastes, mainly waste fuels, were brought to the training area in 55-gallon drums. The contents of the drums were poured onto a mock aircraft just prior to the exercises and burned. Exercises were conducted approximately twice per week using 200 to 300 gallons of POL wastes per exercise. The majority of POL wastes would have been consumed in the fire department training exercises; however, it is assumed that some percolation into the ground undoubtedly occurred.

The overall rating of this site is 47. The receptors subscore (58) is due primarily to the site's proximity to base Well No. 2 (approximately 2,500 feet). The waste characteristics subscore (48) is due to the confirmed disposal of small quantities of hazardous wastes with moderate persistence. The pathways subscore (35) is relatively low because the driving force for ground-water migration is small. Low net precipitation and the presence of a low-permeability layer below the surface account for this low pathways subscore.

- Site No. 5 is the second fire department training area site. This site was used from 1944-1945 and was located at the site of the existing base supply warehouse (Building No. 1325).

  As with Site No. 4, POL wastes, mainly waste fuels, were brought to the training area in 55-gallon drums. The contents of the drums were poured onto a mock aircraft just prior to the exercises and burned. Exercises were conducted approximately twice per week using 200 to 300 gallons of POL wastes per exercise. The majority of POL wastes would have been consumed in the fire training exercises; however, it is assumed that some percolation into the ground undoubtedly occurred.

  The overall rating of this site is 47. The receptors subscore (58) is due primarily to

the site's proximity to base Well No. 2 (approximately 1,800 feet). The waste characteristics subscore (48) is due to the confirmed disposal of small quantities of hazardous wastes with moderate persistence. The pathways subscore (35) is relatively low because the driving force for ground-water migration is small. Low net precipitation and the presence of a low-permeability layer below the surface account for this low pathways subscore.

- Site No. 6 is the location of another fire department training area near the flightline southwest of Building No. 1364. Fire department training exercises were conducted between 1948-1950 and 1951-1953.

  As with Site No. 4, POL wastes, mainly waste fuels, were brought to the training area in 55-gallon drums. The contents of the drums were poured onto a mock aircraft just prior to the exercises and burned. Exercises were conducted approximately twice per week using 200 to 300 gallons of POL wastes per exercise. The majority of POL wastes would have been consumed in the fire department training exercises; however, it is assumed that some percolation into the ground undoubtedly occurred.

  The overall rating of this site is 45. The receptors subscore (52) is due primarily to the site's proximity to base Well No. 4 (approximately 3,600 feet). The waste

characteristics subscore (48) is due to the confirmed disposal of small quantities of hazardous wastes with moderate persistence. The pathways subscore (35) is relatively low because the driving force for ground-water migration is small. Low net precipitation and the presence of a low-permeability layer below the surface account for this low pathways subscore.

- Site No. 7 is the location of a fire department training area site in use from 1953-1962. The site consists of two circular areas located on each side of the abandoned east-west runway (Facility 31024).

  As with Site No. 4, POL wastes, mainly waste fuels, were brought to the training area in 55-gallon drums. The contents of the drums were poured onto a mock aircraft just prior to the exercises and burned. Exercises were conducted approximately twice per week using 200 to 300 gallons of POL wastes per exercise. The majority of POL wastes would have been consumed in the fire department training exercises; however, it is assumed that some percolation into the ground.

  The overall rating of this site is 47. The receptors subscore (48) is due primarily to the site's proximity to base Well No. 5 (approximately 3,500 feet). The waste characteristics subscore (64) is due to the confirmed disposal of medium quantities of hazardous wastes with moderate persistence. The subscore of this site is higher than

those of Sites No. 4, 5, and 6 because of its longer operating history. The pathways subscore (28) is low because of low net precipitation and resultant low driving force and the presence of low permeability strata below the surface.

- <u>Site No. 8</u>, in use since 1962, is the existing fire department training area site. It is located southeast of the power check pads near taxiway "B." POL wastes including waste fuels and commingled waste oils and solvents were used prior to 1975. Since 1975, only JP-4 has been used. However, it was reported that some unauthorized nighttime dumping of POL wastes at this site took place after 1975. A 15,000-gallon underground storage tank was installed in 1975 to store the JP-4. Training exercises were conducted about twice per week using 200 to 300 gallons of POL wastes per exercise. The frequency of training exercises was reduced in 1975 and are presently conducted about 3 times per month during the summer and a maximum of 1 time per month during the winter. About 300 to 500 gallons of fuel are used per fire. Procedures used at this fire department training area include pre-saturation of the area with water prior to introduction of the waste POL or JP-4, and post-ignition of the area after the exercise to burn off residual fuel. Most of the waste fuels, oils, and solvents would have been consumed; however, some percolation into the soil has undoubtedly occurred.

The overall rating of this site is 54. The receptors subscore (56) is due primarily to the site's proximity to base Well No. 1 (approximately 2,700 feet). The waste characteristics subscore (64) is due to the confirmed disposal of medium quantities of hazardous wastes with moderate persistence. This subscore is the same as that for Site No. 7. Both these sites have been in operation longer than Sites No. 4, 5, and 6, all of which had lower waste characteristics subscores. The pathways subscore (43) is due primarily to the proximity of this site (within 100 feet) to a nearby drainage ditch, although this ditch is dry most of the time.

3. Other Sites

- Site No. 9, designated as the Waste Oil Disposal Site, is located at the southeast perimeter of the base. This site consists of a natural depression about 10 to 20 feet deep in which waste oils were disposed. Drums containing these wastes were transported from the flightline shops and emptied at this site. Daily cover was not applied. This site was in use from 1953-1956.

  The overall rating of this site is 48. The receptors subscore (51) is due primarily to the site's proximity to an off-base well (approximately 3,000 feet). The waste characteristics subscore (64) is due to the confirmed disposal of large quantities of wastes with medium hazard potential and

moderate persistence. The pathways subscore (28) is low because of the low net precipitation and resulting low driving force and the presence of low permeability strata below the site.

- Site No. 10, designated as the Perimeter Road Site, is the primary area where waste oils were applied in order to control dust. The location of this site is along the base perimeter road starting south of the wastewater lagoons and extending along most of the existing landfill area. This site was in use through 1975. A truck equipped with a vacuum device would collect waste oils from the flightline, motor pool, and auto hobby shop and transport and apply them to this site.

  The overall rating of this site is 48. The receptors subscore (46) is due primarily to the site's proximity to base Well No. 5 (approximately 5,300 feet). The waste characteristics subscore (64) is due to the confirmed disposal of large quantities of wastes with medium hazard potential. The pathways subscore (35) is due mainly to the proximity of this site to a storm drainage ditch (within 2,000 feet), although this ditch is dry most of the time.

- Site No. 11 is designated as the Fuel Hydrant System Leak/Spill Area. The location of this site is the aircraft parking apron. Two major fuel losses have occurred at this site. The first was due to a leak in the underground fuel transmission line. The other was a fuel spill.

In the first incident, the 16-inch line supplying the refueling outlets developed a leak in its vent line beneath the parking apron. The leak was substantial, with as much as 50,000 gallons of AVGAS lost. The leak occurred in the late 1950s, at which time as much fuel as possible was pumped out of the area, and the line repaired.

The second incident was a subsequent fuel spill of about 14,000 gallons that also took place in the late 1950s. Fuel from KC-97 tankers was being emptied into a defueling tank, but the transfer pumps to the main storage tanks were inadvertently left off. Overflow of the defueling tanks resulted.

As a result of both spills, fuel saturation may still exist below the ground surface.

The overall rating of this site is 58. The receptors subscore (52) is due primarily to the site's proximity to base Well No. 4 (approximately 2,800 feet). The waste characteristics subscore (80) is due to the confirmed spill of large quantities of hazardous wastes with moderate persistence. The pathways subscore of 43 is due mainly to the proximity of this site (approximately 20 feet) to a nearby storm drain drop inlet.

- Site No. 12, designated as the Entomology Shop Yard, is located adjacent to the Entomology Shop, Building No. 2206. This building, constructed in 1958, was converted

to the Entomology Shop in the late 1960s. Application equipment is filled and cleaned within this building. Until about 2 years ago, washwater from the application equipment was allowed to drain onto the outside ground surface. Soil sampling has revealed that low concentrations of several pesticides, including DDT, are present within this area. An underground storage tank was installed about 2 years ago in order to collect the washwater. The tank has been pumped out once and the contents applied to a sterile runway to control weed growth.

The overall rating of this site is 52. The receptors subscore (54) is due primarily to the site's proximity to base Well No. 2 (approximately 1,200 feet). The waste characteristics subscore (60) is due to the confirmed disposal of small quantities of hazardous wastes with high persistence. The pathways subscore (43) is due primarily to the proximity of the site to a nearby drainage ditch (approximately 600 feet), although this ditch is dry most of the time.

o Site No. 13 is designated as the Low-Level Radioactive Material Burial Site. It is located near the wastewater lagoons just west of the base perimeter road. Two containers are present at this site. The first container is a pipe placed vertically in the ground and sealed and capped with concrete. Interviewees report that luminous radioactive aircraft dials from aircraft and possibly radioactive isotopes from the base hospital

were placed in this container. This container was used for about 2 years in the mid-1950s. The second container is a 55-gallon drum provided with a locked hinged top. Several interviewees reported that radioactive electron tubes were placed in this container, although other interviewees stated that parts from small arms were deposited there. A radiological survey of this area indicated no radioactivity at this site.

Since the material is encased in concrete or in a sealed container, no pathways for contaminant migration exist; therefore, this site was not rated.

- Site No. 14, designated as the Corker Material Burial Site, is located west of the perimeter road as it passes along the wastewater lagoons. This site is only several yards away from Site No. 13. Corker material is a boron fiber composite found on the wing of the F-111A. After the crash of an aircraft in July 1979, the corker material was bagged and buried at this site. The concern for corker material is the potential for disruption of electronic equipment by airborne fibers. No known or suspected hazardous wastes were disposed of at this site; therefore, it was not rated.

- Site No. 15, designated as the Munitions Residue Burial Site, is located on the north side of the base near the burn pit operated by Explosive Ordnance Disposal personnel. Casings of unserviceable or expired munitions

were buried here after burning. This site is no longer in use. Casings are now removed by a contractor through DPDO. No known or suspected hazardous wastes were disposed of at this site; therefore, it was not rated.

- Site No. 16, designated as the Used Tire Disposal Site, is located alongside the south perimeter road. It is still in operation and has been in service for at least 20 years. The used tires currently deposited at this site will eventually be sold for salvage. No domestic or industrial wastes have been disposed of at this site; therefore, it was not rated.

- Site No. 17, designated as the Old Burial Trench, is located east of the 4600-4700 housing area. One trench about 20 feet deep and 600 feet long was excavated in 1953 after reactivation of the base. Outdated ammunition, canned food, wrecked jeeps, and other outdated supplies from World War II were placed in this trench. Depositing these items took about 1 week and then the trench was filled. Although live ammunition is suspected to be at this site, there is no pathway in which these munitions could migrate to affect the environment; therefore, this site was not rated.

A total of 17 disposal and spill sites were identified at Mountain Home AFB. Of these, a total of 12 were rated using the HARM rating system. These sites were identified as having a potential for hazardous material contamination and migration. A listing of site ratings is given in Table 8.

Table 8
SUMMARY OF DISPOSAL SITE RATINGS

Site No.	Site Description	Subscore (% of Maximum Possible Score in Each Category)				Page Reference of Site Rating Form
		Receptors	Waste Characteristics	Pathways	Overall Score	
1	Lagoon Landfill	46	64	100	70	J-1
2	B Street Landfill	57	80	35	57	J-3
3	Existing Landfill	51	40	28	40	J-5
4	Fire Department Training Area No. 1	58	48	35	47	J-7
5	Fire Department Training Area No. 2	58	48	35	47	J-9
6	Fire Department Training Area No. 3	52	48	35	45	J-11
7	Fire Department Training Area No. 4	48	64	28	47	J-13
8	Existing Fire Department Training Area	56	64	43	54	J-15
9	Waste Oil Disposal Site	51	64	28	48	J-17
10	Perimeter Road	46	64	35	48	J-19
11	Fuel Hydrant System Leak/Spill Area	52	80	43	58	J-21
12	Entomology Shop Yard	54	60	43	52	J-23

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C. ENVIRONMENTAL STRESS

No evidence of environmental stress resulting from past disposal of hazardous wastes was observed during ground or aerial tours of Mountain Home AFB, Saylor Creek Electronic Warfare Range, Strike Dam Recreation Annex, and the Small Arms Range Annex.

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V. CONCLUSIONS

A. Information obtained through interviews with 42 past and present base personnel, base records, shop folders, and field observations indicates that hazardous wastes have been disposed of on Mountain Home AFB property in the past.

B. No evidence of environmental stress resulting from past disposal of hazardous wastes was observed at Mountain Home AFB.

C. No direct evidence was found to indicate that migration of hazardous contaminants exists within or beyond Mountain Home AFB boundaries. Analyses of base potable water supply wells show that these wells meet primary drinking water standards for pesticides and heavy metals. Elevated nitrate nitrogen levels in Well No. 3 are not related to past hazardous waste disposal practices.

D. The potential for migration of hazardous contaminants is generally low because of the low ground-water table and the low precipitation and high evaporation rate in the area which results in a low driving force for contaminant migration. Exceptions include areas where a driving force exists such as from regular irrigation or standing water. The driving force for potential contaminant migration is high for Site No. 1, the site of sewage lagoons 2 and 3 which were constructed over an old landfill.

E. Assuming that a driving force exists, the potential for contaminant migration is still low because of the low permeability of the soil and cemented layers within the soil horizon. In areas where the soil layer has been

breached by excavation, e.g., landfills, the potential for vertical migration of contaminants is much greater because of the permeability of the underlying basalt.

F. If a driving force exists, e.g., regular irrigation or a pond, then contaminants could move horizontally above the water table if low-permeability strata were encountered. The contaminants could potentially enter a well through an old or improperly constructed well casing and then migrate vertically to the water table. Evidence of well casing pathways exist in base wells located near the golf course which have elevated nitrate nitrogen levels possibly caused by fertilizer application and irrigation of the adjacent golf course.

G. Table 9 presents a priority listing of the rated sites and their overall scores. The following sites were designated as areas showing the most significant potential (relative to other Mountain Home AFB sites) for environmental impact.

1. <u>Site No. 1 (Lagoon Landfill)</u>

This site was the main sanitary landfill for the entire base from 1952 until 1956. Large quantities of waste oils and small quantities of waste solvents were disposed of at this site in the past. Definitions of large, medium, and small quantities of hazardous wastes are included in Appendix D. The existing sewage treatment lagoons 2 and 3 were constructed over this old landfill. The water in the lagoons provides a constant driving force for potential contaminant migration, both from the old landfill and from

Table 9
PRIORITY LISTING OF DISPOSAL SITES

Site No.	Site Description	Overall Score
1	Lagoon Landfill	70
11	Fuel Hydrant System Leak/Spill Area	58
2	B Street Landfill	57
8	Existing Fire Department Training Area	54
12	Entomology Shop Yard	52
10	Perimeter Road	48
9	Waste Oil Disposal Site	48
4	Fire Department Training Area No. 1	47
5	Fire Department Training Area No. 2	47
7	Fire Department Training Area No. 4	47
6	Fire Department Training Area No. 3	45
3	Existing Landfill	40

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possible contaminants in the lagoons themselves. Although the pathway for potential contaminant migration is high, the remoteness of the site and the absence of nearby downgradient wells would reduce the environmental impact of any contaminant migration.

2. <u>Site No. 2 (B Street Landfill)</u>

This site was the main sanitary landfill for the entire base from 1956 until 1969. Medium quantities of hazardous wastes are known to have been disposed of at this site, including waste solvents, thinners, DDT, and leaded AVGAS sludge. The pathways for contaminant migration are low because of the low precipitation in the area and the resulting low driving force. There is still some concern as this site is located upgradient of base water supply wells.

3. <u>Site No. 8 (Existing Fire Department Training Area)</u>

The existing fire department training area has been in use for 20 years. Waste fuels, oils, and solvents were used prior to 1975; only JP-4 has been used since that time. Most of the waste fuels, oils, and solvents would have been consumed in the fires; however, some percolation into the soil has undoubtedly occurred. The persistent components, such as chlorinated solvents, and organic aromatic components of fuel such as benzene and toluene, may be present below the ground surface in this area and pose a concern for potential contaminant migration. The bermed fire

department training area is not drained and therefore collects water after rainfalls and after fire training exercises. This impounded water may provide a driving force for contaminant migration.

4. Site No. 11 (Fuel Hydrant System Leak/Spill Area)

An underground fuel transmission line leak in the late 1950s resulted in the loss of a considerable amount of fuel to the surrounding substrata, possibly as much as 50,000 gallons. A subsequent 14,000-gallon fuel spill occurred on the ground in this same area. It is likely that fuel saturation still exists below the ground surface in this area. The low ground-water table and low driving force for contaminant migration would reduce the environmental impact of a fuel saturated area if it exists.

5. Site No. 12 (Entomology Shop Yard)

The surficial soils in this area are known to be contaminated with low levels of persistent pesticides, caused primarily by the past practice of allowing pesticide application equipment washwater to drain to the outside ground surface. The vertical extent of the soil contamination is not known. There is also some concern that runoff from the area may contaminate a nearby drainage ditch with pesticides. This drainage ditch is dry most of the time which would reduce the environmental impact of low-level pesticide contaminant migration to the ditch.

H. The remaining rated sites (Sites No. 3, 4, 5, 6, 7, 9, and 10) as well as the sites that were not rated are not considered to present significant environmental concerns.

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VI. RECOMMENDATIONS

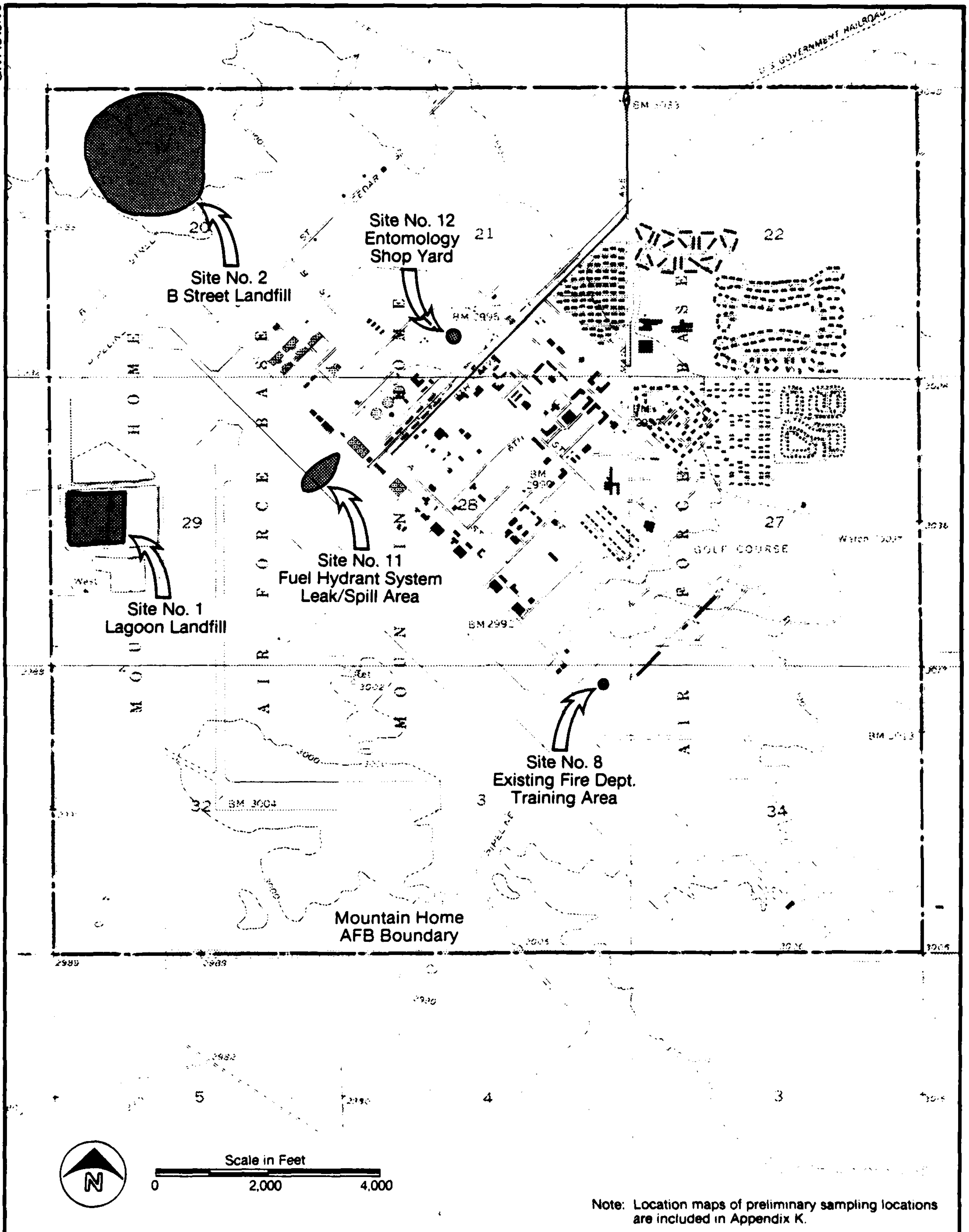
A. PHASE II PROGRAM

A limited Phase II monitoring program is recommended to confirm or rule out the presence and/or migration of hazardous contaminants. The priority for monitoring at Mountain Home AFB is considered low to moderate, and no imminent hazard has been determined.

Tables 10 and 11 present a summary of recommended monitoring sites, parameters to be measured, and the rationale for the analyses; while Figure 19 (page VI-2) shows the sites where monitoring is recommended. Specifically, monitoring is recommended for the Lagoon Landfill (Site No. 1), the B Street Landfill (Site No. 2), the Existing Fire Department Training Area (Site No. 8), the Fuel Hydrant System Leak/ Spill Area (Site No. 11), and the Entomology Shop Yard (Site No. 12). The approximate monitoring locations are shown on Figures 24, 25, 26, 27, and 28 in Appendix E.

1. Lagoon Landfill (Site No. 1)

It is recommended that a monitoring well be installed downgradient of this site to determine if hazardous contaminants are present in the ground water. The well should be drilled to a depth of 50 feet below the water table (approximately 450 feet) and screened from 10 feet above the water table to the bottom of the well. The well should be analyzed for the parameters given in Table 10. The well should be sampled on two occasions at least 30 days apart to determine the presence of contaminants. It is also recommended that sediment samples and water samples be collected from Lagoon No. 2 at the same time as the well samples and analyzed for the parameters given in Table 10.



Note: Location maps of preliminary sampling locations are included in Appendix K.

FIGURE 19. Location Map of Sites Recommended for Limited Phase II Monitoring.

Table 10
RECOMMENDED PHASE II ANALYSES

Sample Type	TOX[a] or VOC[b]	Heavy Metals	Phenols	Pesticides	COD, TOC, and Oil and Grease	Remarks
Monitoring Wells						
Lagoon Landfill (Site No. 1)	X	X	X	X	X	2 samples (1 location, 30 days apart)
B Street Landfill (Site No. 2)	X	X	X	X	X	2 samples (1 location, 30 days apart)
Soil Sampling						
Existing Fire Department Training Area (Site No. 8)	X	X[c]			X	2 samples (1 location and 2 depths)
Fire Hydrant System Leak/Spill Area (Site No. 11)	X	X[c]			X	2 samples (1 location and 2 depths)
Entomology Shop Yard (Site No. 12)				X[d]		6 samples (3 locations and 2 depths)
Surface Water Sampling						
Lagoon Landfill (Site No. 1)--Sewage Lagoon No. 2	X	X	X	X	X	2 samples (1 location, 30 days apart)
Drainage Ditch near Entomology Shop Yard (Site No. 12)				X		1 sample
Bottom Sediment Sampling						
Lagoon Landfill (Site No. 1)--Sewage Lagoon No. 2	X	X[d]		X[d]		2 samples (1 location, 30 days apart)

[a]TOX = total organic halogens.
[b]VOC = volatile organic compounds.
[c]Lead only, EP toxicity
[d]EP toxicity.

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Table 11
RATIONALE FOR RECOMMENDED ANALYSES

Parameter	Rationale
Volatile Organic Compounds (VOCs) or Total Organic Halogen (TOX)	Organic solvents used on base (past and present); persistent components of fuels and other POL products, e.g., benzene and toluene.
Phenols	Phenolic cleaners and paint strippers used in the past.
Heavy Metals (lead, nickel, chromium, cadmium, and silver)	Potential sources identified (leaded fuel, battery acid and electrolyte, paint wastes, photographic chemicals).
Pesticides	Commonly used at Mountain Home AFB; pesticide-contaminated soil found near Entomology Shop.[a]
COD, TOC, and Oil and Grease	Fuel spill indicators and indicators of non-specific contamination.

[a]Pesticide analysis should include aldrin, DDD, DDE, dieldrin, endrin, heptachlor, heptachlor epoxide, lindane, DDT, methoxychlor, chlordane, alpha-BHC, beta-BHC, delta-BHC, and toxaphene.

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2. B Street Landfill (Site No. 2)

It is recommended that a monitoring well be installed downgradient of this site to determine if hazardous contaminants are present in the ground water. The well should be drilled to a depth of 50 feet below the water table (approximately 450 feet) and screened from 10 feet above the water table to the bottom of the well. The well should be sampled on two occasions at least 30 days apart and analyzed for the parameters given in Table 10.

3. Existing Fire Department Training Area (Site No. 8)

A soil boring should be made at the southern end of the active fire department training area to confirm the existence of the hardpan layer. Two soil samples should be collected, one above and one below the hardpan layer (approximately 5 feet and 10 feet deep). The soil samples should be analyzed for the parameters given in Table 10. This will allow a determination to be made of whether contaminants are present in the ground beneath the fire department training area and, if present, of whether the contaminants have migrated through the hardpan layer.

4. Fuel Hydrant System Leak/Spill Area (Site No. 11)

A soil boring should be made in the ground off the aircraft parking apron behind JP-4 Pit No. 4 to confirm the existence of the hardpan layer. Two soil samples should be collected, one above and one below the hardpan layer (approximately 5 feet and 10 feet deep). The soil samples should be visually inspected for evidence of fuel saturation and analyzed for the parameters given in Table 10. This will allow a determination to be made of whether fuel

saturation is present in the area and, if present, of whether the fuel has migrated through the hardpan layer.

5. Entomology Shop Yard (Site No. 12)

Shallow soil samples should be taken in the Entomology Shop yard (Building 2206) to determine if pesticide contamination is restricted to the soil surface or has migrated into the soil column. Soil samples should be collected at three locations, i.e., 10 feet, 20 feet, and 30 feet from the northwest wall of the Entomology Shop in line with the former floor drain discharge. Soil samples should be collected at the surface and at 1 foot below the surface at each location (total of six soil samples) and analyzed for pesticides (Table 10). The nearby drainage ditch should also be sampled after a rainfall to determine if pesticide contamination is entering the ditch.

6. Further details on the limited Phase II monitoring program, including sampling locations, and guidelines for data evaluation, monitoring well installation, sampling protocol, and health and safety plans, are given in Appendix K.

B. OTHER ENVIRONMENTAL RECOMMENDATIONS

1. The out-of-service underground tanks listed in Appendix I reportedly still contain POL products. These tanks should be inspected and any residual POL products should be removed.

2. All underground storage tanks used for the storage of waste materials should be leak tested (e.g., pressure checked) on a periodic basis.

3. EP toxicity testing for heavy metals should be conducted on the fly ash from the coal-fired heating plant to determine if this material is hazardous.

4. The base should continue its program of comprehensive sampling and analysis of active base potable water supply wells. It is recommended that a volatile organic compound (VOC) analysis or a total organic halogen (TOX) analysis be routinely included in addition to the analyses currently performed. This monitoring is recommended as a precautionary measure to determine if a long-term contaminant migration potential exists.

C. LAND USE RESTRICTIONS FOR IDENTIFIED SITES

It is recommended that land use restrictions at the identified disposal and spill sites at Mountain Home AFB be considered. The rationale for imposing land use restrictions include: (1) to provide the continued protection of human health, welfare, and environment; (2) to ensure that the migration of potential contaminants is not promoted through improper land uses; (3) to facilitate the compatible development of future USAF facilities; and (4) to allow for identification of property which may be proposed for excess or outlease.

The recommended guidelines for land use restrictions at each of the identified disposal and spill sites at Mountain Home AFB are presented in Table 12. A description of the land use restriction guidelines is presented in Table 13. Land use restrictions at sites recommended for Phase II monitoring should be reevaluated upon the completion of the Phase II monitoring program and changes made where appropriate.

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Table 12
RECOMMENDED GUIDELINES FOR LAND USE RESTRICTIONS

Site No.	Site Description	Recreational Use	Well Construction On or Near the Site	Housing On or Near the Site	Agricultural Use	Surface-Water Impoundments (Lagoons, Irrigation)	Disposal Operations	Construction	Excavation	Operations or Ignition Sources	Material Storage	Silvicultural Use	Vehicular Traffic	Site Access
1	Lagoon Landfill	X	X	X	NA	NA	X	NA	NA	--	NA	NA	NA	--
2	B Street Landfill	X	X	X	X	X	X	X	X	--	--	--	--	--
3	Existing Landfill	X	X	X	X	X	--	X	X	--	--	--	--	--
4	Fire Dept. Training Area No. 1	X	X	X	X	X	X	X	X	--	--	--	--	--
5	Fire Dept. Training Area No. 2	X	X	X	X	X	X	X	X	--	--	--	--	--
6	Fire Dept. Training Area No. 3	X	X	X	X	X	X	X	X	--	--	--	--	--
7	Fire Dept. Training Area No. 4	X	X	X	X	X	X	X	X	--	--	--	--	--
8	Existing Fire Dept. Training Area	X	X	X	X	X	X	X	X	--	--	--	--	--
9	Waste Oil Disposal Site	X	X	X	X	X	X	--	--	--	--	--	--	--
10	Perimeter Road	X	X	X	X	X	X	--	--	--	NA	--	--	--
11	Fuel Hydrant System Leak/Spill Area	X	X	X	X	X	X	--	--	X	--	--	--	--
12	Entomology Shop Yard Site	X	X	X	X	X	X	--	--	--	--	--	--	--
13	Low-Level Radioactive Material Burial Site	X	X	X	X	X	X	X	X	--	--	--	--	--
14	Corker Material Burial Site	X	X	X	X	X	X	X	X	--	--	--	--	--
15	Munitions Residue Burial Site	X	X	X	X	X	X	X	X	--	--	--	--	--
16	Used Tire Disposal Site	X	X	X	X	X	X	--	--	--	--	--	--	--
17	Old Burial Trench	X	X	X	X	X	X	X	X	--	--	--	--	--

Note: NA = Not Applicable.

Table 13
DESCRIPTION OF LAND USE RESTRICTION GUIDELINES

Guideline	Description
Recreational use	Restrict the use of the site for recreational purposes.
Well construction on or near the site	Restrict the placement of any wells (except for monitoring purposes) on or within a reasonably safe distance of the site. This distance will be site specific based on hydrogeologic conditions.
Housing on or near the site	Restrict the use of housing structures on or within a reasonably safe distance of the site.
Agricultural use	Restrict the use of the site for agricultural purposes to prevent food chain contamination.
Surface-water impoundments (lagoons, irrigation)	Restrict the use of the site for surface-water impoundments, lagoons, or irrigation. Water infiltration could provide a driving force and promote contaminant migration.
Disposal operations	Restrict the use of the site for waste disposal operations, whether above or below ground.
Construction	Restrict the construction of structures which make permanent (or semi-permanent) and exclusive use of a portion of the site's surface.
Excavation	Restrict the disturbance of the cover or subsurface materials.
Burning operations or ignition sources	Restrict any and all unnecessary sources of ignition, due to the possible presence of flammable compounds.
Material storage	Restrict the storage of any and all liquid or solid materials on the site.
Silvicultural use	Restrict the use of the site for silvicultural uses (root structures could disturb cover or subsurface materials)
Vehicular Traffic	Restrict the passage of unnecessary vehicular traffic on the site due to the presence of explosive material(s) and/or of an unstable surface.
Site Access	Restrict access to the site to prevent unknowing or accidental direct contact with potentially hazardous substances.

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VII. SAYLOR CREEK ELECTRONIC WARFARE RANGE

A. DESCRIPTION AND HISTORY OF RANGE

Saylor Creek Electronic Warfare Range is located about 20 air miles southeast of Mountain Home AFB in Owyhee County, Idaho (Figure 1, page I-3). The range is approximately 11.5 miles wide by 15 miles long, covers an area of approximatley 174 square miles, and is situated on a high relatively flat plateau that is bounded by the Snake River Canyon (5 miles from the north range boundary) and by the Bruneau River Canyon along the western range boundary. The land ownership situation for the range is shown on Figure 20, page VII-2. The ordnance impact area, which contains all of the targets, is a fenced area located near the center of the range containing approximately 13,000 acres.

The Saylor Creek Bombing Range, consisting of several thousand acres, was established by the U.S. Army in 1944 and was utilized during and after World War II for various training activities, including artillery, air-to-air gunnery, napalm delivery, and precision bombing. In 1954, an additional 419,120 acres of land was withdrawn from public domain for military use and the range was used by the Strategic Air Command as a scorable precision bombing range. In 1963, the range was reduced in size by 312,400 acres (returned to the Bureau of Land Management) and, in 1968, the remaining land was converted into an air-to-ground gunnery range for the Tactical Air Command. In 1970, another 2,027 acres were returned to the Bureau of Land Management (BLM) and the range was reduced to its present size. Table 14 summarizes the change in size of the Saylor Creenk Electronic Warefare Range since its inception. The range is currently used by active Air Force, Air National Guard and Navy units training in air-to-ground weapons delivery and tactical air-to-ground reconnaissance. In 1982, electronic warfare capabilities were added to the scope of the range and the range name

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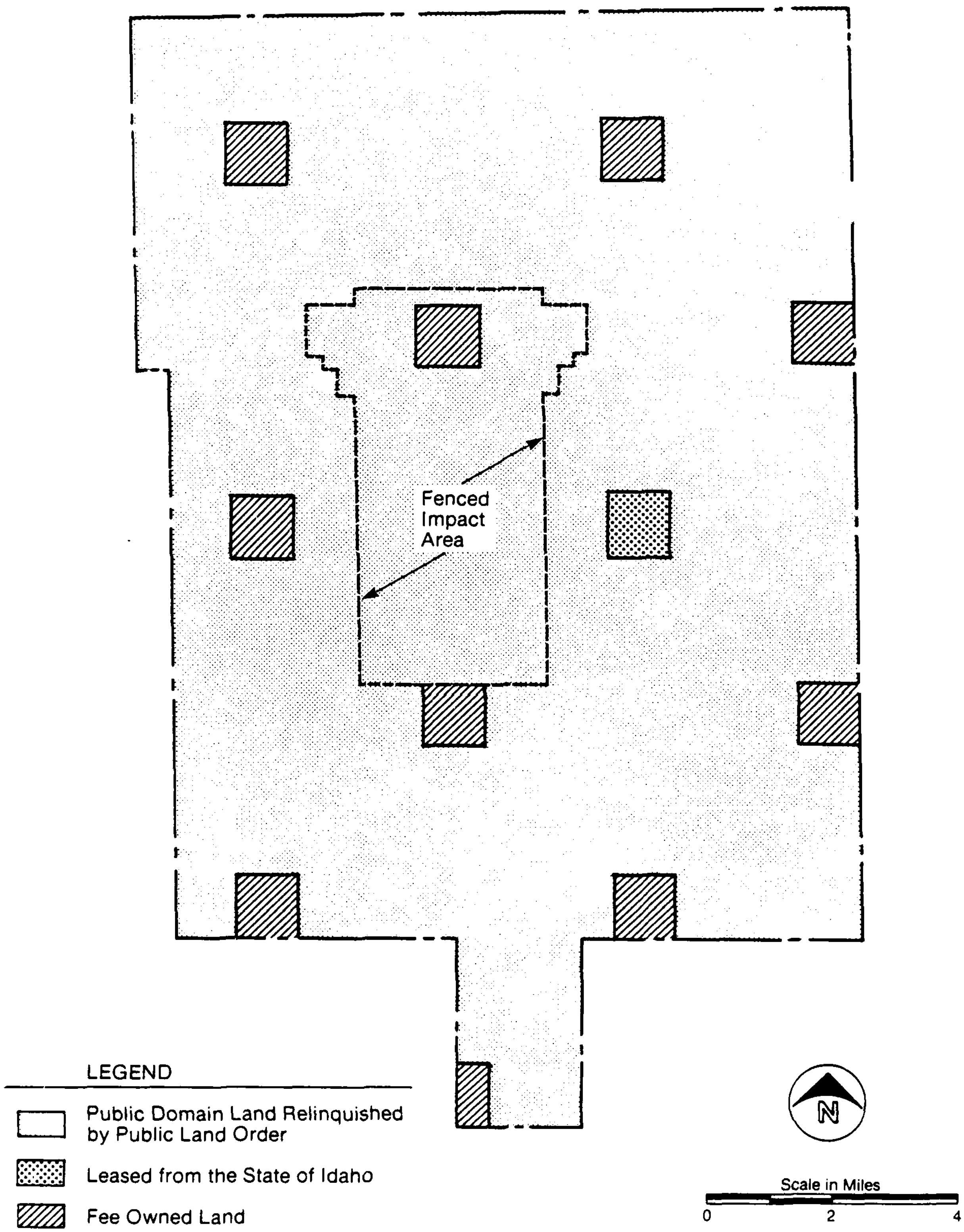

FIGURE 20.
Land Ownership Situation for Saylor Creek Electronic Warfare Range.

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Table 14
SIZE OF SAYLOR CREEK ELECTRONIC WARFARE RANGE,
FROM 1944 to PRESENT

Year	Transaction	Range Size (Acres)
1944	6,667 acres from public domain	6,667[a]
1954	419,120 acres from public domain	425,787[a]
1963	312,400 acres to BLM[b]	113,387[a]
1970	2,027 acres to BLM	117,360[a]

[a]Sizes are approximate.

[b]BLM = Bureau of Land Management.

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changed from Saylor Creek Bombing Range to Saylor Creek Electronic Warfare Range.

B. ENVIRONMENTAL SETTING

1. Geology and Hydrology

The rock formations underlying the Saylor Creek Range consist of several flows of rhyolitic and basaltic volcanics of Pliocene Age and a sedimentary deposit of late Pliocene and Pleistocene Age. This is overlain by late Pleistocene and recent alluvium and terrace deposits consisting of silt, clay, and fine gravels. The rock formations are nearly horizontal, dipping slightly to the north toward the Snake River. The range area contains several faults running generally northwest/southeast with the northern side usually down thrown. The topsoil consists of fine silt, clayey silt, fine sand, and in some places exposed gravel from the most recent sedimentary deposits. The topsoil is known to be about 11 feet deep around the range. The topsoil layer is generally underlain by a low-permeability clay and caliche hardpan layer.

There is no permanent standing water, e.g., rivers, streams, lakes, or ponds, on the range. The average precipitation is less than 8 inches per year and the general scarcity of water limits plant growth to sparse desert grasses. The depth to ground water at the range is unknown. However, an attempt to drill a water supply well was halted at 932 feet due to drilling equipment failure. No water was encountered at this depth. The low precipitation, high evaporation, great depth to ground water and the presence of a low-permeability hardpan layer below ground surface result in a very low potential pathway for contaminant migration from the surface down to the ground water.

2. Environmentally Sensitive Conditions

The vegetation on Saylor Creek Range consists primarily of Giant Western Sagebrush interspersed with desert grasses and some desert annuals, including cheatgrass, Russian thistle, wild mustard, and western bunch grasses. Much of the southern end of the range and adjoining area has been seeded by the BLM to crested wheatgrass for cattle grazing.

Animal populations which have wide distribution throughout the range include coyotes, jack rabbits, ground squirrels, prairie rattlesnakes, and lizards. The ferruginous roughlegged hawk and golden eagle nest within the range. Occasionally wild horses, antelope, and mule deer may enter the range; however, no resident population exists. In general, the scarcity of water and the sparse vegetation limit the wildlife habitats on the range. There are no known threatened or endangered species on the range; however, the Prairie Falcon (threatened species) is known to nest on lands adjoining the range, and it is possible that the Peregrine Falcon (endangered species) nests on the adjoining lands as well. The Bald Eagle (endangered species) may forage the range as it winters along the Snake River.

C. FINDINGS

Facilities at the Saylor Creek Range include a range support building, the main range scoring tower, an equipment shed, and several simulated target areas. There are no water supply wells at the range. Potable water is hauled to the range by truck to a storage tank located next to the range support building. A septic tank/drainfield system is used for disposal of domestic sewage. Trash is hauled

offsite by a contractor. POL products handled at the range include diesel fuel, gasoline, and motor oil. Waste POL, primarily motor oil, is stored in drums and sent to Mountain Home AFB for disposal through the DPDO.

A ground tour of the range on February 3, 1983, a helicopter overflight of the range on March 16, 1983, a search of installation records, and the interviews did not indicate any evidence of environmental stress caused by the handling or disposal of hazardous wastes.

A ground tour inspection of the range support building area on February 3, 1983 indicated no leaks or spills from POL storage tanks and drums. Some minor waste oil spillage, approximately 20 gallons, was noted at the waste POL drum storage area due to overfilling of some of the drums. A helicopter overflight of the entire range on March 16, 1983 and interviews of EOD personnel and contractor range maintenance personnel did not reveal any landfill or burial sites on the range, other than expended ordnance burial sites.

A review of available records and interviews with personnel knowledgeable about the range resulted in the identification of one active and three inactive expended ordnance burial sites (Figure 21, page VII-7). Expended ordnance items consist mainly of practice bombs with black powder spotting charges. Live ordnance is detonated by EOD personnel prior to disposal in the burial trench. EOD activities are routinely conducted about twice per month and a comprehensive border clearance is conducted annually. Past practices may have introduced live munitions and ordnance into some of the inactive burial sites. Although this practice has been discouraged, it cannot positively be stated that any of the burial sites are free of explosive items. Although the burial sites, especially the inactive

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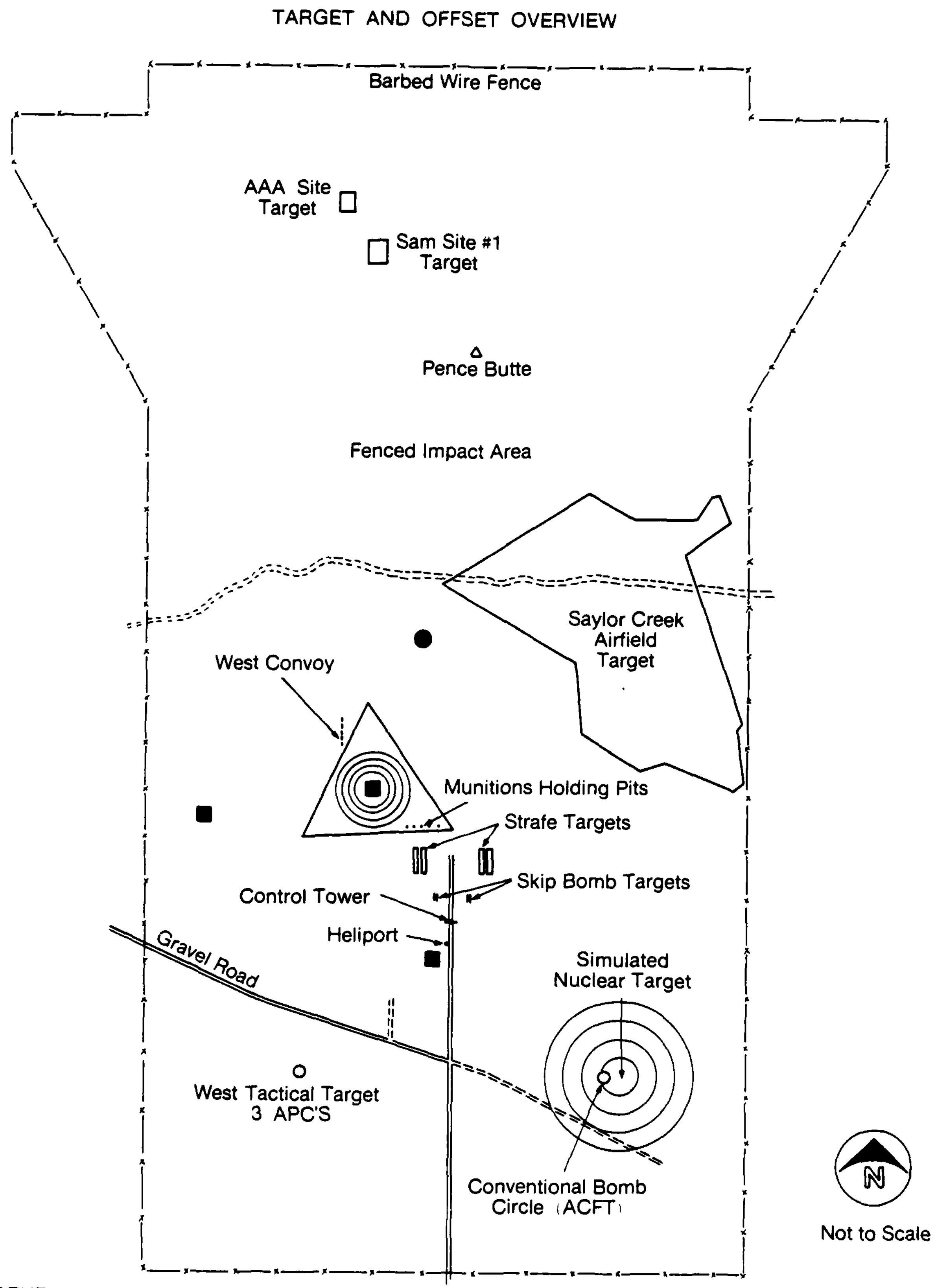

LEGEND

- ● Munitions Residue Burial Site (Active)
- ■ Munitions Residue Burial Site (Inactive)

FIGURE 21.
Locations of Munitions Residue Burial Sites at the Fenced Impact Area of Saylor Creek Range.

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sites, may contain hazardous unexploded ordnance, no potential for contaminant migration exists; therefore, these sites were not rated.

D. CONCLUSIONS

The potential for hazardous contaminant migration from the identified expended ordnance disposal sites at Saylor Creek Range is extremely low because of the following factors: (1) the characteristics of the wastes do not facilitate transport, (2) remoteness of the area, (3) low precipitation, (4) high evaporation, and (5) great depth to ground water.

E. RECOMMENDATIONS

Phase II monitoring is not recommended at any of the identified disposal sites at the Saylor Creek Electronic Warfare Range. Land use restriction guidelines for the fenced impact area of the range include recreational, housing, disposal operations, construction, excavation, vehicular traffic and site access (refer to Table 13, page VI-10 for land use category definitions).

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VIII. OTHER OFF-BASE INSTALLATIONS

A. DESCRIPTION

Two other off-base installations were included in the records search in addition to Saylor Creek Electronic Warfare Range. These include Strike Dam Recreation Annex and the Small Arms Range Annex. The locations of these facilities are shown on Figure 3, page I-3. Investigations conducted on the above facilities included a helicopter overflight on March 16, 1983, a search of available pertinent records, and personnel interviews.

The Strike Dam Recreation Annex is located about 7 air miles southwest of Mountain Home AFB on the C. J. Strike Reservoir, an impoundment of the Snake River. The recreational facilities are located on 3 acres of land (2 acres of fee-owned land and 1 acre of leased land) and include a boat house, a boat dock, and a covered patio. There are no onsite overnight facilities; however, camping is allowed for self-contained recreational vehicles. Potable water is obtained from a well, and a septic tank/drainage system is used for disposal of domestic sewage. All trash generated at the annex is hauled off-site and disposed of in the Mountain Home AFB sanitary landfill. The records search did not indicate the use of or disposal of any hazardous materials or the existence of any landfills at this site.

The Small Arms Range Annex is located approximately 1 mile north of the Mountain Home AFB boundary. The range is irregularly shaped and occupies 2,142 acres (1,622 acres of land withdrawn from the public domain and 520 acres of land leased from the State of Idaho). The land ownership situation for the Small Arms Range Annex is shown on Figure 22, page VIII-2. Present small arms weapons training

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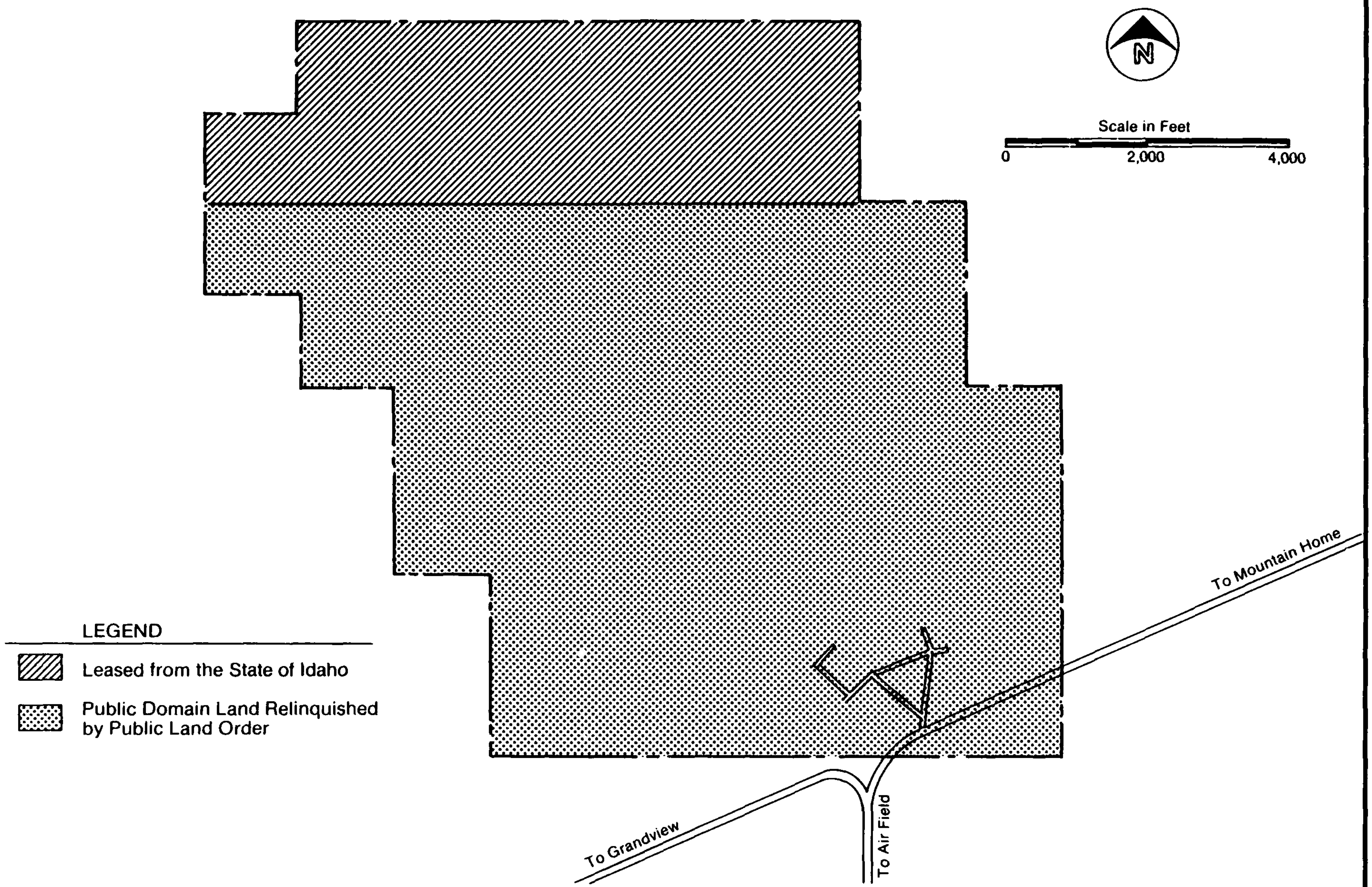

FIGURE 22.
Land Ownership Situation for the Small Arms Range Annex.

include M-16 rifle, 38-caliber revolver, 12-gauge shotgun, 40-mm grenade launcher, and M-60 machine gun. An EOD proficiency range is also located at the site. The records search did not indicate the presence of any past or present landfills or burial sites. A ground clearance survey of a portion of the range uncovered numerous expended smoke grenades and small arms casings. It is possible that some live munitions may be present on or just below the surface in the active areas of the range. Although any live munitions would be hazardous, there is no potential for contaminant migration.

B. CONCLUSIONS

The records search did not identify any disposal or spill sites at any of the other off-base installations. Although some small arms live munitions may be present in active areas of the Small Arms Range Annex, there is no potential for contaminant migration.

C. RECOMMENDATIONS

Phase II monitoring is not recommended at any of the other off-base installations. Land use restriction guidelines for the active areas of the Small Arms Range Annex include recreational, housing, disposal operations, construction, excavation, vehicular traffic and site access (refer to Table 13, page VI-10 for land use category definitions).

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[illegible]

GLOSSARY OF TERMS

1. ALLUVIUM - A general term for clay, silt, sand, gravel, or similar unconsolidated detrital material deposited during comparatively recent geologic time by a stream or other body of running water as a sorted or semisorted sediment in the bed of the stream or on its flood plain or delta.

2. AQUIFER - A geologic formation, or group of formations, that contains sufficient saturated permeable material to conduct ground water to yield economically significant quantities of ground water to wells and springs.

3. BOWSER - A small mobile tank used to recover and transport POL products.

4. CONFINING STRATA - A strata of impermeable or distinctly less permeable material stratigraphically adjacent to one or more aquifers.

5. CONTAMINANT - As defined by section 104(a)(2) of CERCLA, shall include, but not be limited to, any element, substance, compound, or mixture, including disease causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformation, in such organisms or their offspring.

6. DOWNGRADIENT - A direction that is hydraulically down slope. The downgradient direction can be determined through a potentiometric survey or through the evaluation of existing water level elevations referenced to a common datum (mean sea level).

7. DUNNAGE - Packing, usually of loose wood, etc., used to prevent damage in transit.

8. EVAPOTRANSPIRATION - Evaporation from the ground surface and transpiration through vegetation.

9. FLOOD PLAIN - The relatively smooth valley floors adjacent to and formed by alluviating rivers which are subject to overflow.

10. FRIABLE - Condition of a rock or mineral that crumbles naturally or is easily broken, pulverized, or reduced to powder.

11. GROUND WATER - All subsurface water, especially that part that is in the zone of saturation.

12. HAZARDOUS WASTE - A solid waste which because of its quantity, concentration, or physical, chemical or infectious characteristics may -

    (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible, illness; or

    (B) post a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed.

13. INTERCALATED - A layered material that exists or is introduced between layers of a different character, especially said of relatively thin strata of one kind of material that alternate with thicker strata or some other kind of material.

14. LEACHING - The separation or dissolving out of soluble constituents from a rock or ore body by percolation of water.

15. MIGRATION (Contaminant) - The movement of contaminants through pathways (ground water, surface water, soil, and air).

16. NET PRECIPITATION - Mean annual precipitation minus mean annual evapotranspiration.

17. OUTWASH PLAIN - A broad, outspread, flat or gently sloping, alluvial sheet of outwash deposited by meltwater streams flowing in front of or beyond the terminal moraine of a glacier.

18. PD-680 (Type I and Type II) - A military specification for petroleum distillate used as a safety cleaning solvent. The primary difference between PD-680 Type I and Type II is the flash point of the material. The flash points are 100°F and 140°F for PD-680 Types I and II, respectively.

19. PERMEABILITY - The capacity of a porous rock, sediment, or soil for transmitting a fluid without impairment of the structure of the medium; it is a measure of the relative ease of fluid flow under unequal pressure.

20. POTENTIOMETRIC SURFACE - An imaginary surface that represents the static head of ground water and is defined by the level to which water will rise in a cased well.

21. STRATUM - A single and distinct layer, of homogeneous or gradational sedimentary material (consolidated rock or unconsolidated earth) of any thickness, visually separable from other layers above and below by a discrete change in the character of the material deposited or by a sharp physical break in deposition, or by both.

22. TERRACE - Any long, narrow, relatively level or gently inclined surface, generally less broad than a plain, bounded along one edge by a steeper descending slope and along the other by a steeper ascending slope; a large bench or step-like ledge breaking the continuity of a slope.

23. UNSATURATED ZONE (Zone or Aeration) - A subsurface zone containing water under pressure less than that of the atmosphere, including water held by capillarity; and containing air or gases generally under atmospheric pressure. This zone is limited above the land surface and below the surface of the zone of saturation.

24. UPGRADIENT - A direction that is hydraulically up slope. The upgradient direction can be determined through a potentimetric survey or through the evaluation of existing water level elevations referenced to a common datum (mean sea level).

25. VADOSE ZONE - A zone of aeration, occurring above the water table, kept moist by capillary action.

26. WATER TABLE - The upper limit of the portion of the ground wholly saturated with water.

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LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS USED IN THE TEXT

LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS USED IN THE TEXT

AAA	Antiaircraft
ACFT	Aircraft
AFB	Air Force Base
AFESC	Air Force Engineering and Services Center
AFFF	Aqueous Film-Forming Foam
AG	Aboveground
AGE	Aerospace Ground Equipment
APC	Armored Personnel Carrier
AVGAS	Aviation Gasoline
BG	Belowground
Bldg.	Building
BLM	Bureau of Land Management
bls	Below Land Surface
BOD_5	Biochemical Oxygen Demand (5-day)
BX	Base Exchange
°C	Degrees Celsius (Centigrade)
CE	Civil Engineering
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)
COD	Chemical Oxygen Demand
CRS	Component Repair Squadron
DEQPPM	Defense Environmental Quality Program Policy Memorandum
DO	Dissolved Oxygen
DoD	Department of Defense
DPDO	Defense Property Disposal Office
ECM	Electronic Countermeasures
EMS	Equipment Maintenance Squadron
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
°F	Degrees Fahrenheit
ft^2/day	Square Feet per Day
ft/min	Feet per Minute
ft-msl	Feet above Mean Sea Level
gal/yr	Gallons per Year
gpd	Gallons per Day

gpm	Gallons per Minute
gpm/ft	Gallons per Minute per Foot
HARM	Hazard Assessment Rating Methodology
IRP	Installation Restoration Program
JP	Jet Petroleum
lb	Pounds
lb/yr	Pounds per Year
MATS	Military Air Transport Service
Max.	Maximum
mg/l	Milligrams per Liter
mgd	Million Gallons per Day
Min.	Minimum
mo.	Month
MOGAS	Motor Gasoline
mph	Miles per Hour
msl	Mean Sea Level
NDI	Non-Destructive Inspection
No.	Number
NPDES	National Pollutant Discharge Elimination System
PCBs	Polychlorinated Biphenyls
PMEL	Precision Measurement Lab
POL	Petroleum, Oil, and Lubricants
ppb	Parts per billion
RCRA	Resource Conservation and Recovery Act
SAC	Strategic Air Command
TAC	Tactical Air Command
TCE	Trichloroethylene
TFW	Tactical Fighter Wing
TOC	Total Organic Carbon
TOX	Total Organic Halogen
USAF	United States Air Force
USDA	United States Department of Agriculture
USGS	United States Geological Survey
µg/l	Microgram per Liter
VOC	Volatile Organic Compound

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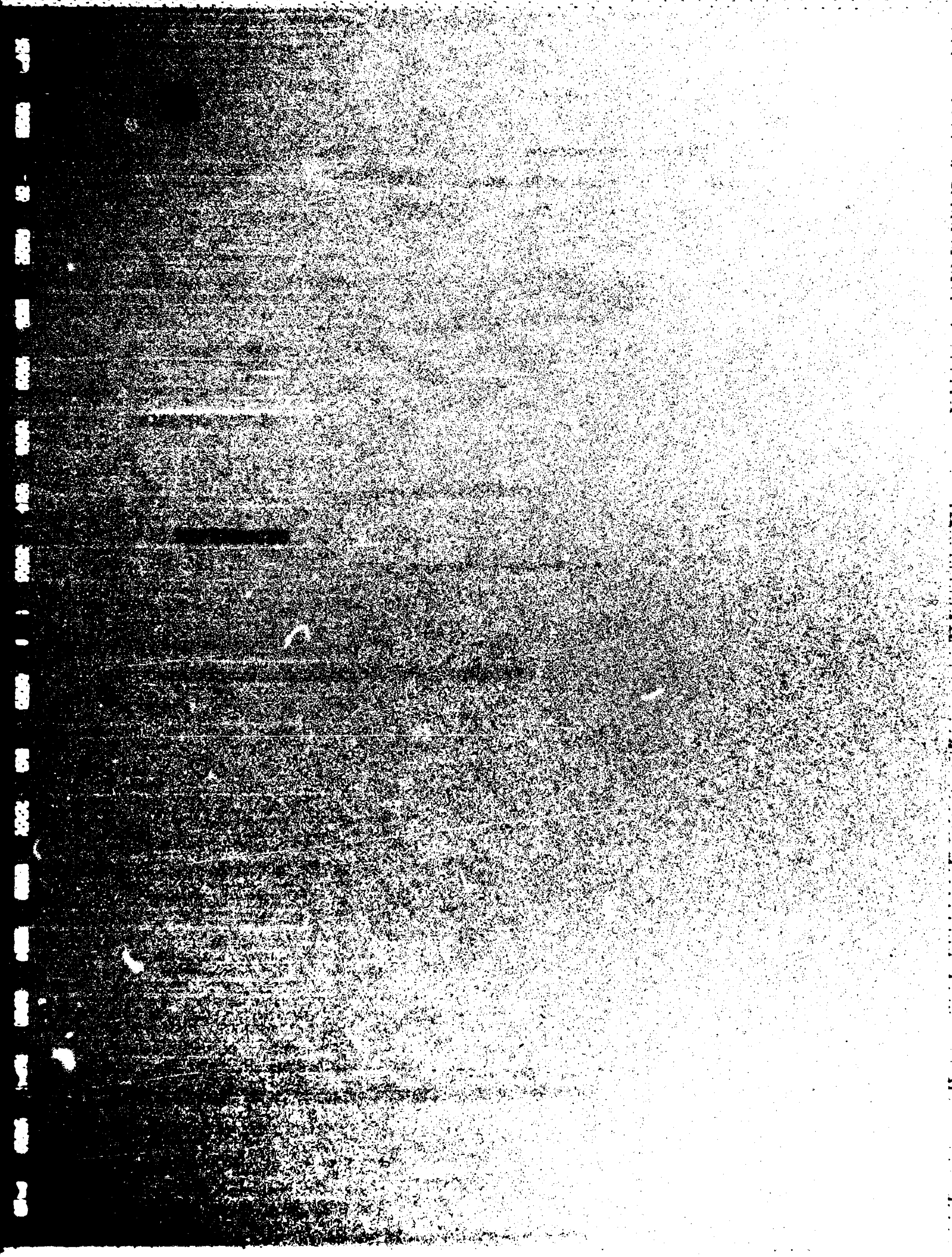

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NORMAN N. HATCH, JR.

Industrial Wastewater and Hazardous Waste Projects Manager

Education

M.S., Environmental Engineering, University of Florida, 1973
M.S., Analytical Chemistry, University of Florida, 1972
B.S., Chemistry, University of New Hampshire, 1969

Experience

Mr. Hatch joined CH2M HILL in 1973 and is currently the Manager of the Industrial Wastewater Reclamation Department. His range of engineering experience includes hazardous waste projects, laboratory and pilot treatability studies, process design of industrial wastewater treatment facilities, and process design of municipal water and wastewater treatment facilities. Examples of his work include:

- Overall responsibility for hazardous materials disposal site records searches for 12 U.S. Air Force installations throughout the United States. The purpose of the records searches is to assess the potential for hazardous contaminant migration from past disposal practices and to recommend follow-up actions.

- Assistance in a comprehensive RCRA compliance program for Gulf Oil Company's Port Arthur Refinery.

- Project manager of a feasibility study for treatment of high nitrogen industrial wastewater from the Air Products and Chemicals, Inc., manufacturing facility in Pensacola, Florida. Treatment technologies investigated included aerated lagoons, oxidation ponds, anaerobic treatment ponds, spray irrigation, activated carbon, and air stripping.

- Project manager of a comprehensive treatability and process selection study for the American Cyanamid Fibers Division plant in Milton, Florida. Investigations included spray irrigation, deep well injection, activated sludge, rotating biological contactors, anerobic contact treatment, activated carbon, ion exhange, and chemical coagulation.

- Project manager for several other treatability and process selection studies for industrial clients including Arizona Chemical Company, Kaiser Agricultural Chemicals, Engelhard Industries, and Production Plating Company.

- Assistance in the negotiation of NPDES permits for Air Products and Chemicals, Inc., American Cyanamid, and Kaiser Agricultural Chemicals.

- Lead engineer on an ozone disinfection feasibility study for the City of Philadelphia's Queen Lane Water Treatment Plant. Also served as chief process engineer for the subsequent design of chemical feed systems at the Queen Lane Plant.

- Process design and design of chemical feed and sludge handling facilities for the Alexander City, Alabama, Water Treatment Plant.
- Process design and design of chemical feed system modifications for the St. Augustine, Florida, Water Treatment Plant.
- Project manager for the design of water treatment facilities, including lime softening, zeolite softening, and granular activated carbon adsorption for a sugar mill in south Florida.
- Project manager for development of a comprehensive water system master plan, including raw water supply, treatment, and distribution systems for the Fort Pierce Utilities Authority, Fort Pierce, Florida.
- Project manager for a feasibility study of direct wastewater reuse for potable water for the City of St. Petersburg, Florida.
- Project manager for the planning, supervision, and performance of pilot plant investigations for the removal of hydrogen sulfide from potable water for the Orlando Utilities Commission, Orlando, Florida.
- Cost-effective analysis and process selection for treatment of combined domestic and paper mill wastewater for the City of Harriman, Tennessee.
- Preparation of various segments of 201 facilities plans for Monroe County (Florida Keys); Lake City, Florida; Alachua County, Florida; Puerto Rico; and Live Oak, Florida.

Before joining CH2M HILL, Mr. Hatch was employed with the E.I. du Pont de Nemours Photo Products Plant in Parlin, New Jersey.

Membership in Organizations

Phi Beta Kappa
Phi Kappa Phi
Society of the Sigma Xi
Water Pollution Control Federation

Professional Engineer Registration

Florida
Georgia

THOMAS A. RIDGIK
Sanitary Engineer

Education

M.S., Environmental Engineering, University of North Carolina, 1981
B.S., Chemical Engineering (with High Honors), Rutgers University, 1970

Experience

Mr. Ridgik's primary responsibilities with the firm involve wastewater treatment plant design. Project assignments have included the following:

- Plant hydraulics and headworks design for a major wastewater treatment plant expansion for the Fort Pierce Utilities Authority, Fort Pierce, Florida.

- Cost estimation and existing facility evaluation for the Manatee County, Florida, Wastewater Master Plan.

- Existing facility evaluation and preliminary plant expansion for General Development Utilities, Port St. Lucie, Florida.

Before joining CH2M HILL, Mr. Ridgik was a graduate research assistant in the University of North Carolina Department of Environmental Sciences and Engineering. He developed improved computer programs for design of water distribution networks in developing countries for a World Bank project and was a teaching assistant for a course in planning and design of low-cost water supply systems.

Prior to his graduate studies, Mr. Ridgik was employed for 3 years as a sanitary engineer with the U. S. Public Health Service in Morgantown, West Virginia. His major responsibilities included testing and certification of gas detector tubes.

Previous experience included the following:

- Peace Corps Volunteer in Ethiopia, in association with the World Health Organization's Smallpox Eradication Program.

- Process Development Engineer with M&T Chemicals, Rahway, New Jersey, where he supervised production of small quantities of various organic compounds, improved the manufacturing processes for large-scale production, and directed start-up of new processes as they were transferred from pilot plant to full-scale manufacturing operations.

Professional Engineer Registration

West Virginia

Membership in Organizations

American Water Works Association
Water Pollution Control Federation

THOMAS A. RIDGIK

Publications

"Heuristic Model for Looped Water Networks." Coauthor D. T. Lauria. Presented at the American Water Works Annual Conference, June 1981

"Nitric Oxide Oxidation Method for Field Calibration of Nitrogen Dioxide Meters." Coauthor William Jones. American Industrial Hygiene Association Journal, June 1980.

"Interaction of Droplet Size Ignition Requirements in External Burning." Coauthors Robert C. Ahlert, Richard L. Peskin, and John W. Gaston, Jr. Presented at the American Institute of Aeronautics and Astronautics, 6th Propulsion Joint Specialist Conference, June 1970.

"Design of Water Distribution Networks Using Linear and Heuristic Programming Master's Technical Report, 1981.

GARY E. EICHLER
Hydrogeologist

Education

M.S., Engineering Geology, University of Florida, 1974
B.S., Construction and Geology, Utica College of Syracuse University, 1972

Experience

Mr. Eichler has been responsible for ground-water projects for both water supply and effluent disposal. Studies have included site selection, well design, construction services, monitoring and testing programs, determination of aquifer characteristics, and well field design. In addition, Mr. Eichler has conducted numerous studies to determine pollution potential of toxic and hazardous wastes. Types of projects for which Mr. Eicher has been directly responsble for include:

- Exploration drilling, testing, and design of well fields for potable water supply with an installed capacity of over 65 mgd.
- Determination of pollutant travel time and direction of movement at hazardous waste disposal sites.
- Geophysical logging and testing programs for deep disposal wells for both municipal and hazardous waste.
- Aquifer modeling studies completed to predict effects of future ground-water withdrawal.
- Determination of saltwater intrusion potential and design of associated monitoring programs.

Prior to joining CH2M HILL in 1976, Mr. Eichler was an engineering geologist with Environmental Science and Engineering, Inc., of Gainesville, Florida. Responsibilities there included project management, soils investigations, siting studies, ground-water and surface-water reports, and Federal and state environmental impact studies. He has professional capabilities in the following areas.

- Hydrogeology. Water supply well location, aquifer testing, well field layout, injection well testing and monitoring program design, and well construction inspection.
- Water resources inventory. Potentiometric mapping, water yield, and availability determinations.
- Site investigations. Determination of subsurface conditions, primarily in soil media. Determination of stratigraphic correlation and associated physical properties for engineering design.
- Environmental permitting. Federal, state, regional, and local permit studies associated with industrial and mining projects.

GARY E. EICHLER

- Clay mineralogy. Clay mineral reactions primarily associated with lime stabilization for highways and other engineering projects. Participated in a Brazilian highway project and developed laboratory analysis for lime-soil reactions.

- Engineering geology. Geologic exploration, soil property determinations for engineering design, and water and earth materials interactions associated with construction.

- Geophysics. Well logging and interpretation.

Mr. Eichler directed the laboratory analysis of tropical soils to determine engineering properties and reaction potential with lime additives for a Brazilian highway project. He also assisted in the preparation and presentation of a seminar on lime stabilization sponsored by the National Lime Association.

Membership in Organizations

American Institute of Professional Geologists
American Water Resources Association
Association of Engineering Geologists
Geological Society of America
Southeastern Geological Society
National Water Well Association

Publications

Engineering Properties and Lime Stabilization of Tropically Weathered Soils. M.S. thesis, Department of Geology, University of Florida. August 1974.

Certifications

Certified Professional Geologist
Certificate No. 4544

CHARLES L. BLAIR
Terrestrial Ecologist

Education

M.S., South Dakota State University, 1978
B.S., University of Wisconsin, 1974

Experience

Mr. Blair is a terrestrial ecologist specializing in wildlife ecology. He has designed several wildlife-related scientific investigations, and has conducted evaluations of Federal regulatory and review agency programs as they relate to resource management. Mr. Blair has also been employed in an administrative capacity in dealing with Indian Tribe-State jurisdictional disputes over wildlife and fishery resources.

The following selected assignments and projects are representative of his specialized skills:

- Wildlife biologist for baseline data collection, analysis, and license application for the Gem State, Eagle Rock, and North Fork-Payette hydroelectric projects in Idaho.
- Wildlife biologist for environmental feasibility studies of the Mackay and Island Park hydroelectric projects in Idaho, as well as the exemption application for Mackay.
- Wildlife biologist for the environmental impact statement for J. R. Simplot Company's Smoky Canyon phosphate mine in southeast Idaho.
- Wildlife biologist for the environmental assessment of several mining developments, including the impact on deer winter range of Ideal Cement's West Devil's Slide limestone quarry, wetland assessment for Kennecott Copper, and impact assessment on wildlife and habitat resulting from coal development in northwestern Wyoming.
- Wildlife biologist for Chevron's Equivalent Protection Demonstration on San Francisco Bay. The project involves long-term sampling and analysis of estuarine wetlands and wildlife, including endangered wildlife species.
- Wildlife biologist for Pacific Gas Transmission's Rocky Mountain Pipeline project and for South Dakota's West River Aqueduct water pipeline project.
- Wildlife biologist for environmental assessment of the North Cache irrigation and hydroelectric project in Idaho.

CHARLES L. BLAIR

- Senior investigator for an ecological study of ferruginous hawks in South Dakota; and wildlife biologist investigating white-tailed deer population dynamics, movements, and habitat selection using telemetry techniques and winter ring-necked pheasant use of South Dakota wetlands.

- Wildlife consultant to the U.S. Fish and Wildlife Service (FWS) for review of FWS responses to U.S. Army Corps of Engineers Section 10/404 permits, compliance with Section 10/404 permits, and assessment of resource agency involvement in highway planning, construction, and maintenance activities.

- Wildlife consultant to the Lower Brule Sioux Tribe to negotiate an agreement between the Tribe and the South Dakota Department of Game, Fish, and Parks. The agreement covered jurisdiction over wildlife and fisheries resources on the Lower Brule Indian Reservation and related topics.

Prior to joining CH2M HILL, Mr. Blair was self-employed for 2 years as a wildlife biologist consulting to the U.S. Fish and Wildlife Service, the Lower Brule Sioux Tribe, and South Dakota State University. He was previously employed as a wildlife biologist by the Department of Wildlife Ecology at the University of Wisconsin-Madison. His personal research involved studies of raptor ecology and avian population dynamics and habitat selection.

Membership in Organizations

American Ornithologists' Union
Cooper Ornithological Society
Wilson Ornithological Society
Raptor Research Foundation
The Wildlife Society
Certified Associate Wildlife Biologist

Publications

Blair, C. L. Survey of Section 10/404 irrigation intake and boat dock permits on the Missouri River in South Dakota and Nebraska. U.S. Department of Interior, Fish and Wildlife Service, Pierre, South Dakota. 14 pg. 1979.

Blair, C. L. Ferruginous hawk using rock in nest defense. Raptor Research. 15:120. 1981.

Blair, C. L. and F. Schitoskey, Jr. In press. Breeding biology and diet of the ferruginous hawk in South Dakota. Wilson Bulletin. Accepted May 6, 1981.

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Hubbard, D. E. and C. L. Blair. Review of Fish and Wildlife Service responses to Section 10/404 permit applications. U.S. Department of Interior, Fish and Wildlife Service, Pierre, South Dakota. 128 pg. 1979.

Appendix B
[illegible] AGENCY CONTACT LIST

Appendix B
OUTSIDE AGENCY CONTACT LIST

1. Idaho Department of Health and Welfare
   Division of Environment
   Daryl F. Koch
   Boise, Idaho
   208/334-4118

2. U.S. Department of the Interior
   Bureau of Land Management
   Sam Mattise
   Hal Harkness
   Boise, Idaho
   208/334-9317
   208/334-1582

3. Idaho Department of Water Resources
   Division of Environment
   Jan Grover
   Stan Szczepanowski
   Boise, Idaho
   208/334-2190

4. Elmore County Agricultural Extension Agency
   University of Idaho
   Mark Calnon
   Mountain Home, Idaho
   208/587-4826

5. U.S.D.A. Soil Conservation Service
   Field Office
   Gene Crisman
   Mountain Home, Idaho
   208/587-3616

6. U.S. Geological Survey
   Water Resources Division
   Herman A. Ray
   Bob Lewis
   Bill Young
   Glen Sisco
   Boise, Idaho
   208/334-1750

7. U.S. Environmental Protection Agency,
   Boise Operations Office
   Hazardous Waste Branch
   Ron Moczygemba
   Boise, Idaho
   208/334-1450

8. Idaho Water Quality Bureau
Field Office
Monty Marchus
Boise, Idaho
208/334-3823

9. U.S. Bureau of Reclamation
Neal Stressman
Gordon Haskett
Boise, Idaho
208/334-1153
208/334-1773

10. U.S.D.A. Soil Conservation Service
Soils Survey Party Leader
Harley Noe
Mountain Home, Idaho
208/587-7017

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Appendix C
MOUNTAIN HOME AFB RECORDS SEARCH INTERVIEW LIST

Interviewee	Area of Knowledge	Years at Installation
1.	Water/Wastewater	31
2.	Water/Wastewater	5
3.	Civil Engineering	31
4.	Fire Department	30
5.	Fire Department	19
6.	Fire Department	10
7.	Fire Department	9
8.	Roads/Grounds	10
9.	Solid Waste Disposal	25
10.	Fuels Maintenance	26
11.	Aircraft Maintenance	29
12.	Entomology	2
13.	Defense Property Disposal Office, Base Supply	20
14.	Defense Property Disposal Office, Base Supply	15
15.	Roads/Grounds	16
16.	Construction Management	15
17.	Paint Shop	17
18.	Exterior Electric Shop	22
19.	Interior Electric Shop	16
20.	Metal Shop	22
21.	Aircraft Maintenance	20
22.	Fuels Management	4
23.	Fuels Management	2
24.	Entomology	5
25.	Explosive Ordnance Disposal	2
26.	Explosive Ordnance Disposal	2
27.	Service Station Management	6
28.	Environmental Coordinator	4
29.	Civil Engineering	20
30.	Roads and Grounds	20
31.	Roads and Grounds	16
32.	Bioenvironmental Engineering	2
33.	Bioenvironmental Engineering	8
34.	Bioenvironmental Engineering	4
35.	Civil Engineering, Saylor Creek Electronic Warfare Range	20
36.	Carpenter Shop	27
37.	Mechanical Engineering	18
38.	Heat Plant	5
39.	Aircraft Maintenance	18
40.	Aircraft Maintenance/Vehicle Maintenance	7
41.	Aircraft Maintenance	25
42.	Saylor Creek Electronic Warfare Range	5

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[illegible] [illegible] RATING METHODOLOGY

USAF INSTALLATION RESTORATION PROGRAM
HAZARD ASSESSMENT RATING METHODOLOGY

BACKGROUND

The Department of Defense (DoD) has established a comprehensive program to identify, evaluate, and control problems associated with past disposal practices at DoD facilities. One of the actions required under this program is to:

> "develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts." (Reference: DEQPPM 81-5, 11 December 1981).

Accordingly, the United States Air Force (USAF) has sought to establish a system to set priorities for taking further actions at sites based upon information gathered during the Records Search phase of its Installation Restoration Program (IRP).

The first site rating model was developed in June 1981 at a meeting with representatives from the USAF Occupational and Environmental Health Laboratory (OEHL), Air Force Engineering and Services Center (AFESC), Engineering-Science (ES) and CH2M HILL. The basis for this model was a system developed for EPA by JRB Associates of McLean, Virginia. The JRB model was modified to meet Air Force needs.

After using this model for 6 months at over 20 Air Force installations, certain inadequacies became apparent. Therefore, on January 26 and 27, 1982, representatives of

USAF OEHL, AFESC, various major commands, Engineering Science, and CH2M HILL met to address the inadequacies. The result of the meeting was a new site rating model designed to present a better picture of the hazards posed by sites at Air Force installations. The new rating model described in this presentation is referred to as the Hazard Assessment Rating Methodology.

PURPOSE

The purpose of the site rating model is to provide a relative ranking of sites of suspected contamination from hazardous substances. This model will assist the Air Force in setting priorities for follow-on site investigations and confirmation work under Phase II of IRP.

This rating system is used only after it has been determined that (1) potential for contamination exists (hazardous wastes present in sufficient quantity), and (2) potential for migration exists. A site can be deleted from consideration for rating on either basis.

DESCRIPTION OF MODEL

Like the other hazardous waste site ranking models, the U.S. Air Force's site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DoD program needs.

The model uses data readily obtained during the Record Search portion (Phase I) of the IRP. Scoring judgments and computations are easily made. In assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and the worst hazards at the site. Sites are given low scores only if there are clearly

no hazards at the site. This approach meshes well with the policy for evaluating and setting restrictions on excess DoD properties.

Site scores are developed using the appropriate ranking factors according to the method presented in the flow chart (Figure 1). The site rating form is provided on Figure 2 and the rating factor guidelines are provided in Table 1.

As with the previous model, this model considers four aspects of the hazard posed by a specific site: the possible receptors of the contamination, the waste and its characteristics, the potential pathways for waste contaminant migration, and any efforts to contain the contamination. Each of these categories contains a number of rating factors that are used in the overall hazard rating.

The receptors category rating is calculated by scoring each factor, multiplying by a factor weighting constant, and adding the weighted scores to obtain a total category score.

The pathways category rating is based on evidence of contaminant migration or an evaluation of the highest potential (worst case) for contaminant migration along one of three pathways. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned and for direct evidence 100 points are assigned. If no evidence is found, the highest score among three possible routes is used. These routes are surface-water migration, flooding, and ground-water migration. Evaluation of each route involves factors associated with the particular migration route. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The waste characteristics category is scored in three steps. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor, which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score, while scores for sludges and solids are reduced.

The scores for each of the three categories are then added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Scores for sites at which there is no containment are not reduced. Scores for sites with limited containment can be reduced by 5 percent. If a site is contained and well managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste management practices category factor to the sum of the scores for the other three categories.

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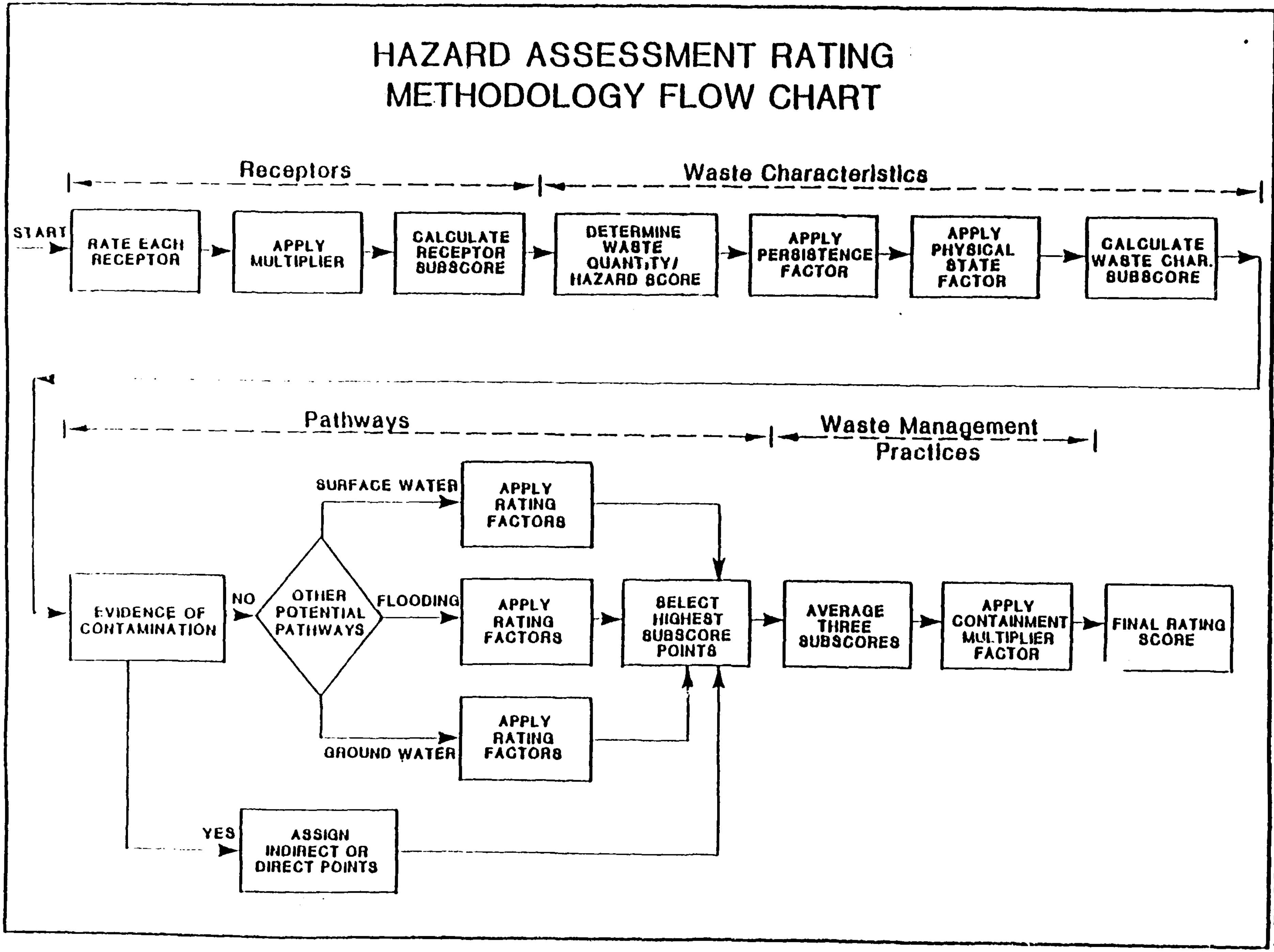
HAZARD ASSESSMENT RATING
METHODOLOGY FLOW CHART
Receptors
Waste Characteristics
START
RATE EACH RECEPTOR
APPLY MULTIPLIER
CALCULATE RECEPTOR SUBSCORE
DETERMINE WASTE QUANTITY/ HAZARD SCORE
APPLY PERSISTENCE FACTOR
APPLY PHYSICAL STATE FACTOR
CALCULATE WASTE CHAR. SUBSCORE
Pathways
Waste Management Practices
EVIDENCE OF CONTAMINATION
NO
YES
OTHER POTENTIAL PATHWAYS
SURFACE WATER
FLOODING
GROUND WATER
APPLY RATING FACTORS
APPLY RATING FACTORS
APPLY RATING FACTORS
ASSIGN INDIRECT OR DIRECT POINTS
SELECT HIGHEST SUBSCORE POINTS
AVERAGE THREE SUBSCORES
APPLY CONTAINMENT MULTIPLIER FACTOR
FINAL RATING SCORE
FIGURE 1

FIGURE 2

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE ____________________

LOCATION ____________________

DATE OF OPERATION OR OCCURRENCE ____________________

OWNER/OPERATOR ____________________

COMMENTS/DESCRIPTION ____________________

SITE RATED BY ____________________

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site		4		
B. Distance to nearest well		10		
C. Land use/zoning within 1 mile radius		3		
D. Distance to reservation boundary		6		
E. Critical environments within 1 mile radius of site		10		
F. Water quality of nearest surface water body		6		
G. Ground water use of uppermost aquifer		9		
H. Population served by surface water supply within 3 miles downstream of site		6		
I. Population served by ground-water supply within 3 miles of site		6		
Subtotals			____	____

Receptors subscore (100 X factor score subtotal/maximum score subtotal) ____

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) ____
2. Confidence level (C = confirmed, S = suspected) ____
3. Hazard rating (H = high, M = medium, L = low) ____

Factor Subscore A (from 20 to 100 based on factor score matrix) ____

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

____ X ____ = ____

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

____ X ____ = ____

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore ______

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water		8		
Net precipitation		6		
Surface erosion		8		
Surface permeability		6		
Rainfall intensity		8		
		Subtotals	______	______

Subscore (100 X factor score subtotal/maximum score subtotal) ______

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
2. Flooding		1		

Subscore (100 x factor score/3) ______

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water		8		
Net precipitation		6		
Soil permeability		8		
Subsurface flows		8		
Direct access to ground water		8		
		Subtotals	______	______

Subscore (100 x factor score subtotal/maximum score subtotal) ______

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore ______

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors ______
Waste Characteristics ______
Pathways ______

Total ______ divided by 3 = ______
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

______ X ______ = ☐

Table 1
HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES

I. RECEPTORS CATEGORY

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
A. Population within 1,000 feet (includes on-base facilities)	0	1-25	26-100	Greater than 100	4
B. Distance to nearest water well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet	10
C. Land Use/Zoning (within 1-mile radius)	Completely remote (zoning not applicable)	Agricultural	Commercial or Industrial	Residential	3
D. Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet	6
E. Critical environments (within 1-mile radius)	Not a critical environment	Natural areas	Pristine natural areas; minor wetlands; preserved areas; presence of economically important natural resources susceptible to contamination	Major habitat of an endangered or threatened species; presence of recharge area; major wetlands	10
F. Water quality/use designation of nearest surface water body	Agricultural or Industrial use	Recreation, propagation and management of fish and wildlife	Shellfish propagation and harvesting	Potable water supplies	6
G. Ground-water use of uppermost aquifer	Not used, other sources readily available	Commercial, industrial, or irrigation, very limited other water sources	Drinking water, municipal water available	Drinking water, no municipal water available; commercial, industrial, or irrigation, no other water source available	9
H. Population served by surface water supplies within 3 miles downstream of site	0	1-15	51-1,000	Greater than 1,000	6
I. Population served by aquifer supplies within 3 miles of site	0	1-50	51-1,000	Greater than 1,000	6

Table 1--Continued

II. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

S = Small quantity (5 tons or 20 drums of liquid)
M = Moderate quantity (5 to 20 tons or 21 to 85 drums of liquid)
L = Large quantity (20 tons or 85 drums of liquid)

A-2 Confidence Level of Information

C = Confirmed confidence level (minimum criteria below)	S = Suspected confidence level
o Verbal reports from interviewer (at least 2) or written information from the records	o No verbal reports or conflicting verbal reports and no written information from the records
o Knowledge of types and quantities of wastes generated by shops and other areas on base	o Logic based on a knowledge of the types and quantities of hazardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site

A-3 Hazard Rating

Rating Factors	Rating Scale Levels 0	1	2	3
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Level 2	Sax's Level 3
Ignitability	Flash point greater than 200°F	Flash point at 140°F to 200°F	Flash point at 80°F to 140°F	Flash point less than 80°F
Radioactivity	At or below background levels	1 to 3 times background levels	3 to 5 times background levels	Over 5 times background levels

Use the highest individual rating based on toxicity, ignitability and radioactivity and determine the hazard rating.

Hazard Rating	Points
High (H)	3
Medium (M)	2
Low (L)	1

Table 1--Continued

II. WASTE CHARACTERISTICS--Continued

Waste Characteristics Matrix

Point Rating	Hazardous Waste Quantity	Confidence Level of Information	Hazard Rating
100	L	C	H
80	L	C	M
	M	C	H
70	L	S	H
60	S	C	H
	M	C	M
50	L	S	M
	L	C	L
	M	S	H
	S	C	M
40	S	S	H
	M	S	M
	M	C	L
	L	S	L
30	S	C	L
	M	S	L
	S	S	M
20	S	S	L

Notes:
For a site with more than one hazardous waste, the waste quantities may be added using the following rules:
Confidence Level
- o Confirmed confidence levels (C) can be added.
- o Suspected confidence levels (S) can be added.
- o Confirmed confidence levels cannot be added with suspected confidence levels.

Waste Hazard Rating
- o Wastes with the same hazard rating can be added.
- o Wastes with different hazard ratings can only be added in a downgrade mode, e.g., MCM + SCH = LCM if the total quantity is greater than 20 tons.

Example: Several wastes may be present at a site, each having an MCM designation (60 points). By adding the quantities of each waste, the designation may change to LCM (80 points). In this case, the correct point rating for the waste is 80.

B. Persistence Multiplier for Point Rating

Persistence Criteria	Multiply Point Rating From Part A by the Following
Metals, polycyclic compounds, and halogenated hydrocarbons	1.0
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.8
Easily biodegradable compounds	0.4

C. Physical State Multiplier

Physical State	Multiply Point Total From Parts A and B by the Following
Liquid	1.0
Sludge	0.75
Solid	0.50

Table 1--Continued

III. PATHWAYS CATEGORY

A. Evidence of Contamination

Direct evidence is obtained from laboratory analyses of hazardous contaminants present above natural background levels in surface water, ground water, or air. Evidence should confirm that the source of contamination is the site being evaluated.

Indirect evidence might be from visual observation (i.e., leachate), vegetation stress, sludge deposits, presence of taste and odors in drinking water, or reported discharges that cannot be directly confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

B-1 Potential for Surface Water Contamination

Rating Factors	Rating Scale Levels: 0	1	2	3	Multiplier
Distance to nearest surface water (includes drainage ditches and storm sewers	Greater t'an 1 mile	2,001 feet to 1 mile	501 feet to 2,000 feet	0 to 500 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	6
Surface erosion	None	Slight	Moderate	Severe	8
Surface permeability	0% to 15% clay ($>10^{-2}$ cm/sec)	15% to 30% clay (10 to 10^{-4} cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	Greater than 50% clay ($>10^{-6}$ cm/sec)	6
Rainfall intensity based on 1-year 24-hour rainfall	<1.0 inch	1.0 to 2.0 inches	2.1 to 3.0 inches	>3.0 inches	8

B-2 Potential for Flooding

Rating Factors	0	1	2	3	Multiplier
Floodplain	Beyond 100-year floodplain	In 100-year floodplain	In 10-year floodplain	Floods annually	1

B-3 Potential for Ground-Water Contamination

Rating Factors	0	1	2	3	Multiplier
Depth to ground water	Greater than 500 feet	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to + 20 inches	Greater than +20 inches	6
Soil permeability	Greater than 50% clay ($>10^{-6}$ cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	0% to 15% clay ($<10^{-2}$ cm/sec)	8

Table 1--Continued

B-3 Potential for Ground-Water Contamination--Continued

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
Subsurface flows	Bottom of site greater than 5 feet above high ground-water level	Bottom of site occasionally submerged	Bottom of site frequently submerged	Bottom of site located located below mean ground-water level	8
Direct access to ground water (through faults, fractures, faulty well casings, subsidence, fissures, etc.)	No evidence of risk	Low risk	Moderate risk	High risk	8

IV. WASTE MANAGEMENT PRACTICES CATEGORY

A. This category adjusts the total risk as determined from the receptors, pathways, and waste characteristics categories for waste management practices and engineering controls designed to reduce this risk. The total risk is determined by first averaging the receptors, pathways, and waste characteristics subscores.

B. Waste Management Practices Factor

The following multipliers are then applied to the total risk points (from A):

Waste Management Practice	Multiplier
No containment	1.0
Limited containment	0.95
Fully contained and in full compliance	0.10

Guidelines for fully contained:

Landfills:

- o Clay cap or other impermeable cover
- o Leachate collection system
- o Liners in good condition
- o Adequate monitoring wells

Surface Impoundments:

- o Liners in good condition
- o Sound dikes and adequate freeboard
- o Adequate monitoring wells

Spills:

- o Quick spill cleanup action taken
- o Contaminated soil removed
- o Soil and/or water samples confirm total cleanup of the spill

Fire Protection Training Areas:

- o Concrete surface and berms
- o Oil/water separator for pretreatment of runoff
- o Effluent from oil/water separator to treatment plant

General Note: If data are not available or known to be complete the factor ratings under items I-A through I, III-B-1, or III-6-3, then leave blank for calculation of factor score and maximum possible score.

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Appendix E
INSTALLATION HISTORY

Appendix E
INSTALLATION HISTORY

The history of Mountain Home AFB is described in the following narrative, which was developed from two sources, i.e., the Base Fact Sheet of Mountain Home AFB (Reference 7) and the 1982 Annual Review, Real Property Study, Mountain Home AFB (Reference 9).

Mountain Home Air Force Base has had a varied and busy career. During World War II, heavy bombardment (B-24) groups and combat crews were trained prior to June 1945. Then, a swift succession of plans and preparations for training combat crews for B-32s, then B-29s, and again B-24s, foundered upon the shoals of indecision and ended with the close of hostilities. Except for a flurry of activity from December 1948 until November 1949 to support the 5th Strategic Reconnaissance Wing, the base became host of the Military Air Transport Service (MATS) program for the training of tactical wings of the new Air Resupply and Communications Service (ARCS). In May 1953, Mountain Home became a Strategic Air Command (SAC) base to support the 9th Bombardment (later Strategic Aerospace) Wing, and also, beginning in 1960, three nearby Titan I missile complexes.

On 20 June 1942, the District Engineer of the United States Corps of Army Engineers at Portland, Oregon, was instructed by the Division Engineer and the Commanding General, Second Air Force, to investigate proposed sites for an air base near Jerome, Idaho. His report of 6 July suggested a site 10 miles southwest of Mountain Home, Idaho. The site, consisting of barren, undeveloped, low-priced ($1 to $2 an acre) land, offered engineering advantages that would substantially reduce both construction time and costs. It would require little filling and grading, and it had none of the irrigation canals and drainage ditches that characterized the developed (about $95 an acre) real estate of the

Jerome sites that would require expensive and time-consuming relocation. The Mountain Home site was chosen and construction began on 30 November 1942.

Listed as Army Air Base, Mountain Home, in a War Department memo on 8 February 1943, the field bore that designation during most of that year, despite a subsequent memo of 7 July calling the installation Army Air Field, Mountain Home. Early in December, the latter designation was specified by the Second Air Force. In mid-October 1944, the official designation became Mountain Home Army Air Field. More than 3 years later, on 13 January 1948, the field was redesignated Mountain Home Air Force Base.

As construction progressed at the field, more and more personnel of various support units arrived. The first base commander, Lt. Colonel Carlos L. Reavis, assumed command on 29 January 1943. The first medical officer arrived on 9 April, and altitude training unit was activated the next day. A cadre of an aviation guard squadron arrived 5 May to guard the base during construction. A service squadron reported on 22 June, and an airdrome squadron arrived 2 August. When Mountain Home Army Air Field was officially opened on 7 August, the northwest-southeast and east-west runways (10,000 footers) were available for daytime and limited night operations, but the north-south runway (8,500 feet) was not yet ready. Two weeks later, on 21 August, the U.S. Army Air Forces accepted Mountain Home from the Corps of Engineers, and the general contractors, J. A. Terteling and Sons of Boise, Idaho, and employees were presented the Army-Navy "E" award for excellence in building the base.

By the end of August 1943, construction of the entire base (costing nearly $13,000,000) was substantially finished. Besides the runways, taxiways, and parking apron,

the projects included headquarters, administrative and classroom buildings, four hangars, an engineering shop, a hospital, a theater, barracks, mess halls, sub-depot facilities, warehouses, gasoline storage tanks, utilities, sanitary and drainage sewers, roads, a railroad spur from the Union Pacific track in Mountain Home to the base, and a 12-mile four-lane highway between the base and town. Further, four wooden towers for celestial-navigation training were erected, the last three becoming ready in January 1944. Bombing and gunnery ranges were built in the region about the base, the largest being Saylor Creek Aerial Gunnery Range. An on-base housing project for civilian employees was started. Housing in town, like that in all small communities near burgeoning wartime installations, was inadequate for military and civilian needs.

The first heavy bombardment group to be stationed at Mountain Home was the 396th. Activated there by the Second Air Force on 16 February 1943, it was directed to reach full strength by 25 April and begin training about 2 May. Early in April, however, the group was transferred without personnel and equipment (no aircraft had yet arrived at Mountain Home) to Moses Lake, Washington, where it became a replacement training unit (RTU) for B-17 combat crews. What the 396th was to do at Mountain Home, and why it was transferred, is not clear at this time. It may be noted that the 15th Bombardment Wing, to which Mountain Home was assigned in January 1943, had begun in April to shift from training in B-17s to that in B-24s; the transfer of the group to a B-17 base was a logical one.

The 470th Bombardment Group (Heavy), the next to be stationed at Mountain Home, was activated there on 1 May 1943, and drew its personnel from bombardment groups in Wyoming and at other Idaho bases, and from the 18th Replacement Wing at Salt Lake City, Utah. This Second Air

Force Group, equipped with B-24s in August, functioned as an RTU and processed 52 combat and 18 model crews by the end of that month. Although designated on 27 August as an operational training unit (OTU), the 470th continued training individual combat crews into December. In September, 50 combat crews were given first phase training; in October, 39 crews; and in November, 75 crews.

Meanwhile, early in September 1943, the 467th Bombardment Group (Heavy) had been transferred from Wendover, Utah, to Mountain Home AFB, to assemble its personnel, but not to train there. Its air echelon cadre, obtained from 470th Group personnel, left for Orlando, Florida, on the 12th while its ground echelon departed for Kearns, Utah, in mid-October.

The 470th Group was responsible for training at Mountain Home AFB until 28 November 1943, when the 20th Base Headquarters and Air Base Squadron was given that job. The 20th Squadron, which was also responsible for support activities at the base, was not ready for its new task, and training continued under the 470th. Providing 67 crews with first and second phase training in December, the group continued at the base until 1 January 1944, when it moved to Tonopah, Nevada. At that time, the training of the 490th Bombardment Group, which had been started by the 470th, was taken over by the 20th Squadron. Training continued under the 20th until 25 March 1944, when the 213th Army Air Forces Base Unit was organized to assume the squadron's training and support mission.

Early in April 1944, the base unit became responsible for training B-24 combat crews rather than groups, and by 20 April the 490th Group had completed training and was bound for England. However, during April the Heavy unit

arrived so that the base unit resumed its role as an OTU until early in June. By then, the 494th was on its way to Hawaii and combat in the North Pacific.

Beginning on 27 May 1944, and throughout June, training personnel from Peterson Field at Colorado Springs, Colorado, arrived to set up Mountain Home's combat crew training program. Three classes of crews came from Peterson and from Lincoln, Nebraska, during June. The first, reporting around the 1st, completed the training started at Peterson graduated, and was gone by 11 July. Eleven classes in all graduated 610 B-24 combat crews at Mountain Home from July 1944 to 6 June 1945. Classes averaged 55 crews and received from 74 to 120 days of training.

The base was largely successful in keeping half of its 60-odd B-24s ready for training every day. In the fall of 1944, pursuit planes from bases in Colorado and Idaho and naval air stations in Oregon and Washington, flew occasional interceptions against the trainee crews, but around the turn of the year a few P-63s were assigned to Mountain Home AFB for that purpose. These were replaced by P-38s the following spring, which gave place to P-63As in July.

In February 1945, jurisdiction of the base was transferred from the Second to the Fourth Air Force. This produced the usual reorganization, in which the Second Air Force base unit that had been responsible for the operation of the base and for the training program, was replaced by a similar unit of the Fourth Air Force.

Training of B-24 crews continued under the fourth, but by April, plans were being made to change to crew training for the B-32 Dominator. Very soon B-24 crews and aircraft were on their way to other stations, while at Mountain Home, B-32 parts were assembled, minor runway repairs were made,

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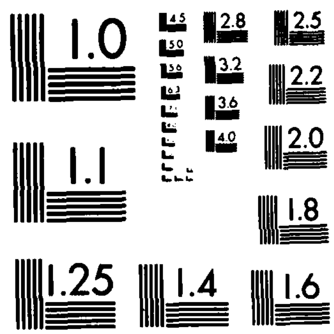

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

new maintenance platforms were built, and base personnel were sent to factories and other bases for familiarization with the new aircraft. The first B-32 landed at the base 26 May, followed within a few days by six more, but all had come for staging only, not training. Then, early in June, the B-32 plans were cancelled; Mountain Home AFB was to train B-29 crews instead.

On 23 June 1945, 3 days after Mountain Home AFB returned to Second Air Force control, the first three B-29s arrived at the field for use in maintenance training only. By mid-August, 2 score were present for flight training, but on the 17th, the crews of the first B-29 class, which had reported on V-J Day, learned that they would not train at Mountain Home; as a result, the crews and more than half of the B-29s left the field by the end of the month.

The 301st Bombardment Group (Very Heavy) and the 530th Air Service Group (Very Heavy), which had been stationed at Mountain Home since mid-August (the former with no personnel and the latter with only a few), had transferred without personnel and equipment to Pyote Army Air Field, Texas, on 23 August. Transferred back to Fourth Air Force control the same day, Mountain Home began preparations for proficiency training of B-24 crews.

Thus, it was that 200 B-24 crews arrived at Mountain Home early in September. Organized into three classes, they were combined into one on the 24th, only to have all training at the base stop 2 days later. Separation of personnel from military service had attained priority over flight training. Not long after, on 5 October, Mountain Home AFB was placed on temporary inactive status as a sub-base of Gowen Field, in Boise, Idaho, and its remaining personnel spent the rest of the month and early November inactivating its facilities.

Inactive, Mountain Home Army Air Field remained a sub-base of Gowen until about 1 January 1946, when it became a satellite station of Walla Walla Army Air Field in Washington. Many changes occurred in March. On the 21st, Continental Air Forces was redesignated Strategic Air Command (SAC), and, 10 days later, Mountain Home AFB was reassigned from the Fourth Air Force to SAC's newly activated Fifteenth. Continuing as a satellite of Walla Walla until 1 October, the still inactive base then came under the direct control of 15th's headquarters at Colorado Springs. This arrangement lasted until the organization of a base service squadron at Mountain Home on 1 August 1948.

Four months later, on 1 December 1948, Mountain Home Air Force Base was placed on active status and transferred from 15th Air Force to SAC's 311th Air Division, Reconnaissance (later the 311th Air Division), which had its headquarters at Topeka (later Forbes) Air Force Base, Kansas. About 9 days later, an air base group (the 4205th) took over operation of the base.

The long-asleep base began stirring early in 1949. More personnel began reporting, buildings were opened, flight control and communications facilities were readied for use, and a few RB-17s were assigned. By 29 May, personnel of Headquarters, 5th Reconnaissance Group, Very Long Range, Photo, had reported, most of them from Clark Air Force Base in the Philippines. Two strategic reconnaissance photo squadrons (the 23rd and 72nd) and a photo technical unit began arriving late in June, the last two coming from Alaska. All of these preparations and movements culminated in the activation on 16 July, of the 5th Strategic Recon Wing, and its support groups, with the wing commander assuming command of the base.

In expectation of the arrival of the two B-29 reconnaissance squadrons, repairs had been started in May. Contracts were awarded to repair roads, install a new water main, re-roof buildings, repair the electrical utilities, and rehabilitate some housing in town.

The base's new role was short-lived. On 24 August, the Associated Press announced the proposed inactivation of the base. Late in September, it was learned that the 5th Wing would move to California, and by 11 November, the Wing was gone, completing a transfer and movement begun nearly a month before. Meanwhile, on 1 November, Mountain Home had been reassigned from the 311th Division to the Second Air Force, which had its headquarters at Barksdale Air Force Base, Louisiana. Late in January 1950, the target date of 25 April was set for inactivation of the base.

With a SAC reorganization on 1 April 1950, Mountain Home passed from the jurisdiction of the Second Air Force to that of the 15th. Then a sub-base of Fairfield-Suisun (later Travis) Air Force Base in California, Mountain Home continued in that status until the Military Air Transport Service (MATS) assumed jurisdiction of the inactive base from SAC on 24 January 1951. The base was activated on 1 February, and 9 days later, the District Engineers from Seattle, Washington, arrived to set up priorities for rehabilitating base facilities. The task of preparing Mountain Home to receive an Air Resupply and Communications Wing in April, was handed to the 1701st Air Transport Wing.

A preliminary survey by the Wing had judged the base, now comprising some 5,952 acres, to be in fair-to-good condition. Nevertheless, the small cadre that arrived in mid-February faced many problems. Only one runway, in poor conditions, was usable. Facilities for housing and messing, maintenance and fueling, flight control and communication,

as well as utilities, required much repair or replacement. By 1 April, however, Mountain Home was ready to support 900 and more officers and men. True, base operations and base flight could handle only limited traffic, crash and ground-control approach equipment was not due until May, and runway resurfacing had to wait until early summer. Later in the year, the railroad spur to the base was repaired, water mains replaced, and some family housing rehabilitated. During the fall, to ease the housing shortage, a large number of barracks at inactive Gowen Field were pressed into use under Mountain Home control. Much of the new construction started in 1951 was completed the following year and included a warehouse, a fire station, a fuel storage tank, and a 400-unit family housing project. Large-scale work on runways, utilities, and various buildings was to begin early in 1953.

On 1 April 1951, Mountain Home and the 1706th Air Base Group, which had been made responsible for the base, was reassigned to the Continental Division of MATS, and two weeks later, the 580th Air Resupply and Communications (ARC) Wing was activated. This was the first of 3 such wings organized at Mountain Home as part of MAT's Air Resupply and Communication Service, which had been activated on 23 February. After training in the United States, the ARC wings were deployed overseas under the operational control of theater commander. In peacetime, the wings augmented the air resupply and communications capability of the theater to which they were assigned. In wartime, they were also to prepare, reproduce, and disseminate psychological warfare material at the direction of the theater commander.

The second ARC Wing (the 581st) was activated at Mountain Home and began training on 23 July 1951. When 3 months later, on 1 November, the base was assigned from the Continental Division to the ARC Squadron, the 1706th

Group became the 1300th Air Base Group and the 1300th Air Base Wing was organized with a 1300th Training Squadron. The new wing operated the base and such satellite locations as Gowen Field and provided the 580th and 581st wings with base facilities, logistics, and training support. The training squadron furnished the classrooms, instructors, training aids, and other materials, and also prepared the curricula and schedules--formal and on-the-job training carried out by the ARC wing commanders. Survival training was conducted near McCall, Idaho.

The training squadron's school of psychological warfare and intelligence moved to Gowen Field in February 1952, but returned to Mountain Home after Gowen was slated to close in August. The squadron also provided instruction in aircraft maintenance, electronic communications, lithography and binding, techniques in briefing, the packaging of pamphlets for air drop, and survival and flight training of aircrews in B-29, C-119, and SA-16 aircraft.

Following the movement of the 581st ARC Wing to Clark Air Force Base and 13th Air Force control in the Philippines during July 1952, and 580th Wing to Wheelus Field in Libya and the jurisdiction of USAF in Europe in September, the 582nd ARC wing was activated at Mountain Home on 24 September and began training. In April of 1953, however, the ARCS mission at Mountain Home came to an end, when the 1300th Wing moved its training personnel and units and the still training 582nd Wing to Great Falls AFB in Montana. At the same time, the people of the wing's support outfits remained at Mountain Home and became members of the 9th Bombardment Wing (Medium) when SAC's 15th Air Force took over the base on 1 May.

The arrival of the 9th Bombardment Wing at Mountain Home launched a long period of organizational stability and material progress for the base and the region. The 9th Wing, which included the oldest active organization (1st Bombardment Squadron) in the Air Force, was equipped with B-29s and KB-29s, upon its arrival at Mountain Home. In the fall of 1954, it converted to B-47s and KC-97s, the first B-47 arriving at the base on 23 September and the first KC-97 arriving on 10 September.

By mid-February 1955, the first B-47 and KC-97 crews were combat ready and the 9th Wing's first training mission was flown. Forty-five of the Stratojets were deployed to RAD Station, Fairford, England, between late May and mid-July 1955, but generally the 9th Wing operated from Mountain Home. An exception to this developed early in 1962, when the wing began rotating a B-47 alert force to Andersen AFB on Guam, a commitment which ended April 1964.

On 12 December 1958, the Wing was awarded the Air Force Outstanding Unit Award for the period from 1 January 1957 until 31 January 1958, when it pioneered and tested a new alert concept, which demonstrated an Air Force capability to launch a retaliatory strike force without delay.

The construction work begun in 1951 was accelerated under SAC after May 1953. The Bennett Mountain Park Housing (197 families) built in town during World War II was again rehabilitated and used until mid-December 1964. The post war on-base Public Housing Authority project (400 families) and the Brick Quarters (120 families) were supplemented by the construction of 500 Wherry Housing units (Mountain Village) during 1954-1955, and of 270 Capehart Housing units during 1958 and 1959. Nine permanent barracks for airmen were completed April 1954.

Other construction included shops for the maintenance of aircraft, armament, and electronics; a parachute building; a cold storage plant, extension and strengthening of the parking apron, runways, and taxiways; utilities; field lighting; hydrant refueling; and storage facilities for fuel and ammunition. In December 1954, a 12,000-foot runway for the B-47 operations, an extension of a 10,000 footer, was opened. In February 1955, the base was directed to establish trangulation scoring on bomb drops at the Saylor Creek Range and to maintain a second range in the area. A new base elementary school was opened 7 months later, and a new $2,000,000 base hospital of 50 beds was completed in 1958.

In 1959, the 813th Air (later Strategic Aerospace) Division was activated at Mountain Home. In February of the following year, construction of three missile complexes, each equipped to launch three Titan I intercontinental ballistic missiles, began at sites south, west, and north-northwest of the base. The first missile arrived by plane on 13 April 1962, and was installed at the site near Orchard, Idaho, on the 24th. All three complexes passed under control of the 569th Missile Strategic Squadron on 27 August. Organized at Mountain Home almost 15 months before, the squadron was a component of the 9th Wing, which had been redesignated a strategic aerospace wing in April 1962.

Mountain Home AFB's mission remained unchanged for the next 2 years. Its routine was disturbed only briefly by the Cuban crisis in the fall of 1962, when the 9th Wing dispersed its planes to other stations. In July 1964, however, the 813th Air Division headquarters moved to Malmstrom AFB in Montana, and in November the Department of Defense announced that the base's missile sites were to be inactivated by the end of June 1965.

At the end of 1965, the aging B-47s were being phased out of the Air Force, and as part of the planned phaseout of the B-47 fleet, the base was transferred to the Tactical Air Command, and the 67th Tactical Reconnaissance Wing arrived with its RF-4C Phantom IIs in January of 1966.

In May 1971, the 67th Tactical Reconnaissance Wing transferred with aircraft to Bergstrom AFB, Texas, and was replaced by the 347th Tactical Fighter Wing. The 347th TFW with two squadrons, the 389th and 391st, were equipped with the F-111F swing-wing tactical fighter bomber.

In November 1972, the 366th Tactical Fighter Wing replaced the 347th TFW and brought a third squadron to Mountain Home Air Force Base, the 390th Tactical Fighter Squadron, to bring the wing to full strength.

Late in 1976, the Air Force announced that the F-111Fs assigned to the 366th Tactical Fighter Wing would be transferred to RAF Lakenheath United Kingdom, with crews. This move called READY SWITCH/CREEK SWING, was the result of a congressional mandate to modernize North Atlantic Treaty Organization (NATO) forces.

The F-111As assigned to the 474th Tactical Fighter Wing at Nellis Air Force Base, Nevada, were transferred to the 366th TFW, and a fourth squadron, the 388th Tactical Fighter Training Squadron, was activated in July 1977, to provide for the increased training role of the 366th. The movement of aircraft was completed in August 1977. On 30 September 1979, the 388th was inactivated and the 389th became a training squadron in its place.

In the summer of 1977, the Air Force began testing a prototype weapons system at Mountain Home Air Force Base. This aircraft, the EF-111A, was designed for a pure

electronic warfare mission, using newly developed radar jamming components mounted in an original F-111A airframe. Three years of test and evaluation proved successful, and the EF-111A went into production. On 1 July 1981, the 388th again activated, this time as an Electronic Combat Squadron (ECS). The 388th ECS is now highly visible in the Air Force as the only squadron flying production model EF-111As.

Effective 1982, Electronic Warfare personnel from Gila Bend, Arizona, began their movement to Mountain Home Air Force Base in coordination with further EF-111A training and the unit assimilated into the 366th Tactical Fighter Wing.

An additional function was also added to the scope of the Saylor Creek range, electronic warfare, and the range name changed from Saylor Creek Bombing Range to Saylor Creek Electronic Warfare Range.

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Appendix F
WATER USE CLASSIFICATION AND WATER QUALITY

WATER USE CLASSIFICATIONS OF RIVER SEGMENTS
LOCATED AT THE BOUNDARY OF THE
MOUNTAIN HOME AFB STUDY AREA

	Designated Uses	
Possible Use	Snake River, King Hill to C. J. Strike Dam	Snake River, C. J. Strike Dam to Boise River
Domestic water supply	Protected for general use	Protected for general use
Agricultural water supply	Protected for general use	Protected [illegible] general use
Cold water biota	Protected for future use	Protected [illegible] future use
Warm water biota	--	--
Salmonid spawning	Protected for future use	Protected [illegible] ire use
Primary contact recreation	Protected for general use	Protected f[illegible] future use
Secondary contact recreation	Protected for general use	--
Special resource water	Protected for general use	--

EXPLANATION OF WATER USE CLASSIFICATIONS

Waters are designated according to the uses for which they are presently suitable or intended to become suitable. The designated uses for which the waters of the State of Idaho are to be protected include, but are not limited to:

Agricultural Water Supplies. Waters which are suitable or intended to be made suitable for the irrigation of crops or as drinking water for livestock.

Domestic Water Supplies. Waters which are suitable or intended to made suitable for drinking water supplies.

Cold Water Biota. Waters which are suitable or intended to be made suitable for protection and maintenance of viable communities of aquatic organisms and populations of significant aquatic species which have optimal growing temperatures below 18°C.

Warm Water Biota. Waters which are suitable or intended to be made suitable for protection and maintenance of viable communities of aquatic organisms and populations of significant aquatic species which have optimal growing temperatures above 18°C.

Salmonid Spawning. Waters which provide or could provide a habitat for active self-propagating populations of salmonid fishes.

EXPLANATION OF WATER USE CLASSIFICATIONS--Continued

Primary Contact Recreation. Surface waters which are suitable or intended to be made suitable for prolonged and intimate contact by humans or for recreational activities when the ingestion of small quantities of water is likely to occur. Such waters include, but are not restricted to, those used for swimming, water skiing, or skin diving.

Secondary Contact Recreation. Surface waters which are suitable or intended to made suitable for recreational uses on or about the water and which are not included in the primary contact category. These waters may be used for fishing, boating, wading, and other activities where ingestion of raw water is not probable.

Special Resource. A water designated as a special resource has at least one of the following characteristics:

- The water is of outstandingly high quality, exceeding both the standards for primary contact recreation and cold water biota; or
- The water is of unique ecological significance; or
- The water possesses outstanding recreational or aesthetic qualities; or
- Intensive protection of the quality of the water is in the paramount interest of the people of Idaho; or
- The water is a part of the National Wild and Scenic River System, is within a State or National Park or wildlife refuge and is of prime or major importance to that park or refuge; or
- Intensive protection of the quality of the water is necessary to maintain an existing, but jeopardized beneficial use.

Source: Idaho Water Quality Standards and Wastewater Treatment Requirements, 1980.

SNAKE RIVER WATER QUALITY DATA[a]

Parameter	Analysis
Flow	5,740 cfs
Specific conductance	488 μmhos
pH	8.5
Water temperature	23.0°C
Hardness	190 mg/l as $CaCO_3$
Calcium, dissolved	43 mg/l as Ca
Magnesium, dissolved	20 mg/l as Mg
Sodium, dissolved	32 mg/l as Na
Potassium, dissolved	4.5 mg/l as K
Sulfate, dissolved	53 mg/l as SO_4
Chloride, dissolved	26 mg/l as Cl
Fluoride, dissolved	0.6 mg/l as F
Silica, dissolved	27 mg/l as SiO_2
Solids, sum of constituents, dissolved	305 mg/l
Solids, dissolved	0.41 tons per ac-ft
Nitrogen, NO_2 + NO_3, dissolved	0.52 mg/l as N
Phosphorus, total	0.03 mg/l as P
Alkalinity	160 mg/l as $CaCO_3$

Source: Water Resources Data, Idaho, Water Year 1981, Volume 2

[a]Samples collected on the main stem of the Snake River near Murphy, Idaho, on August 18, 1981.

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Appendix G
MASTER LIST OF INDUSTRIAL ACTIVITIES

Shop Name	Present Location and Dates (Building No.)	Past Location and Dates (Building No.)	Handles Hazardous Materials	Generates Hazardous Waste	Current Treatment/Storage/Disposal Methods
366TH Combat Support Group					
Auto Hobby	1340 1961-Present	--	X	X	Holding tank to DPDO
Wood Hobby	2806 1973-Present	--	--	--	
Base Photo Lab	1333 1955-Present	--	X	--	Consumed in use
Small Arms Range	1333 1955-Present	--	--	--	
Arts and Crafts	2806 1973-Present	--	X	--	Consumed in use
Security Police Armament	1013 1953-Present	--	--	--	
Commissary Meat Department	2610 1974-Present	--	--	--	
366TH Civil Engineering Squadron					
Fire Extinguisher Maintenance	261 1953-Present	--	X	--	Consumed in use
Entomology	2206 1958-Present	--	X	X	Consumed in use; holding tank to sterile runway
Interior Electric	1300 1959-Present	--	--	--	
Exterior Electric	1301 1959-Present	--	X	X	Contractor removal
Appliance Repair	1301 1959-Present	--	X	--	DPDO
Power Production	1300 1966-Present	211 1951-1966	X	X	Drums to "burn pit"; drain to sanitary sewer
Carpenter	1210 1943-Present	--	X	--	Consumed in use
Sheet Metal	1300 1959-Present	--	X	--	Consumed in use
Plumbing	1300 1959-Present	--	X	--	Consumed in use
Paint Shop	1300 1959-Present	--	X	--	Consumed in use
Heat Plant	1328 1955-Present	--	X	X	DPDO; drain to sanitary sewer
Water/Waste	1403 1943-Present	--	X	--	Consumed in use
Refrigeration	1301 1959-Present	--	X	--	Consumed in use
Heat	1301 1959-Present	--	X	--	Consumed in use
Liquid Fuels	1301 1959-Present	--	X	X	Contaminated JP-4 to fire training
Pavements and Grounds	1300 1959-Present	--	--	--	
Heavy Equipment	1354 1962-Present	--	--	--	
366TH CRS					
Avionics	1327 1954-Present	--	X	--	Consumed in use
ECM Pod	1333 1955-Present	--	X	X	DPDO
Electric	1224 1954-Present	211 1951-1954	X	X	Neutralized to sanitary sewer
Propulsion	1225 1973-Present	--	X	X	DPDO
Environmental Systems	1224 1954-Present	211 1951-1954	X	X	DPDO
Machine	1224 1954-Present	211 1951-1954	--	--	
NDI	1222 1972-Present	1224 1954-1972	X	X	DPDO; drain to sanitary sewer
PMEL	927 1974-Present	--	X	--	Consumed in use
Structural Repair	1224 1954-Present	211 1951-1954	X	--	Consumed in use
Pneudraulic	1224 1954-Present	211 1951-1954	X	X	DPDO
Metal Processing	1224 1954-Present	211 1951-1954	--	--	

Appendix G--Continued

Shop Name	Present Location and Dates (Building No.)		Past Location and Dates (Building No.)		Handles Hazardous Materials	Generates Hazardous Waste	Current Treatment/Storage/Disposal Methods
366TH EMS							
Corrosion Control	1332	1955-Present		--	X	X	DPDO; drain to sanitary sewer
AGE	1359	1971-Present	211	1943-1945 1948-1950 1951-1971	X	X	DPDO; drain to sanitary sewer
Armament	1229	1971-Present		--	X	X	Holding tank to DPDO
Egress	272	1957-Present		--	X	--	Consumed in use
Munitions Trailer Maintenance	1340	1961-Present		--	X	X	DPDO
Fuel Systems	1335	1970-Present		--	X	X	To flightline recycle system
Repair and Reclamation	208	1982-Present	1224	1954-1982	X	X	DPDO
Phase Docks	1229	1971-Present	211	1943-1954	X	X	DPDO
Transit Alert	208	1982-Present			X	--	Consumed in use
Munitions Storage	3020	1956-Present		--	X	--	Consumed in use
EOD	272	1957-Present		--	X	--	Consumed in use
Munitions Line Delivery	3020	1956-Present		--	--	--	
Munitions Maintenance	3020	1956-Present		--	X	X	DPDO
Munitions Inspection	3018	1955-Present		--	X	--	Consumed in use
366TH Supply Squadron							
Fuels Lab	1319	1971-Present		--	X	X	DPDO; drain to sanitary sewer
Fuel Distribution	1333	1955-Present		--	X	X	DPDO; drain to sanitary sewer
Material Storage and Distribution	1325	1953-Present		--	--	--	
366TH Transportation Squadron							
Vehicle Maintenance	1100	1980-Present		--	X	X	Holding tank to DPDO
Fire Truck Maintenance	261	1953-Present		--	X	X	Drums to DPDO
Minor Maintenance	1100	1960-Present		--	--	--	Neutralized to sanitary sewer
Refueling Maintenance	1125	1954-Present		--	X	X	Holding tank to DPDO
Packing and Grating	1325	1953-Present		--	--	--	
Railroad	2201	1943-Present		--	--	--	

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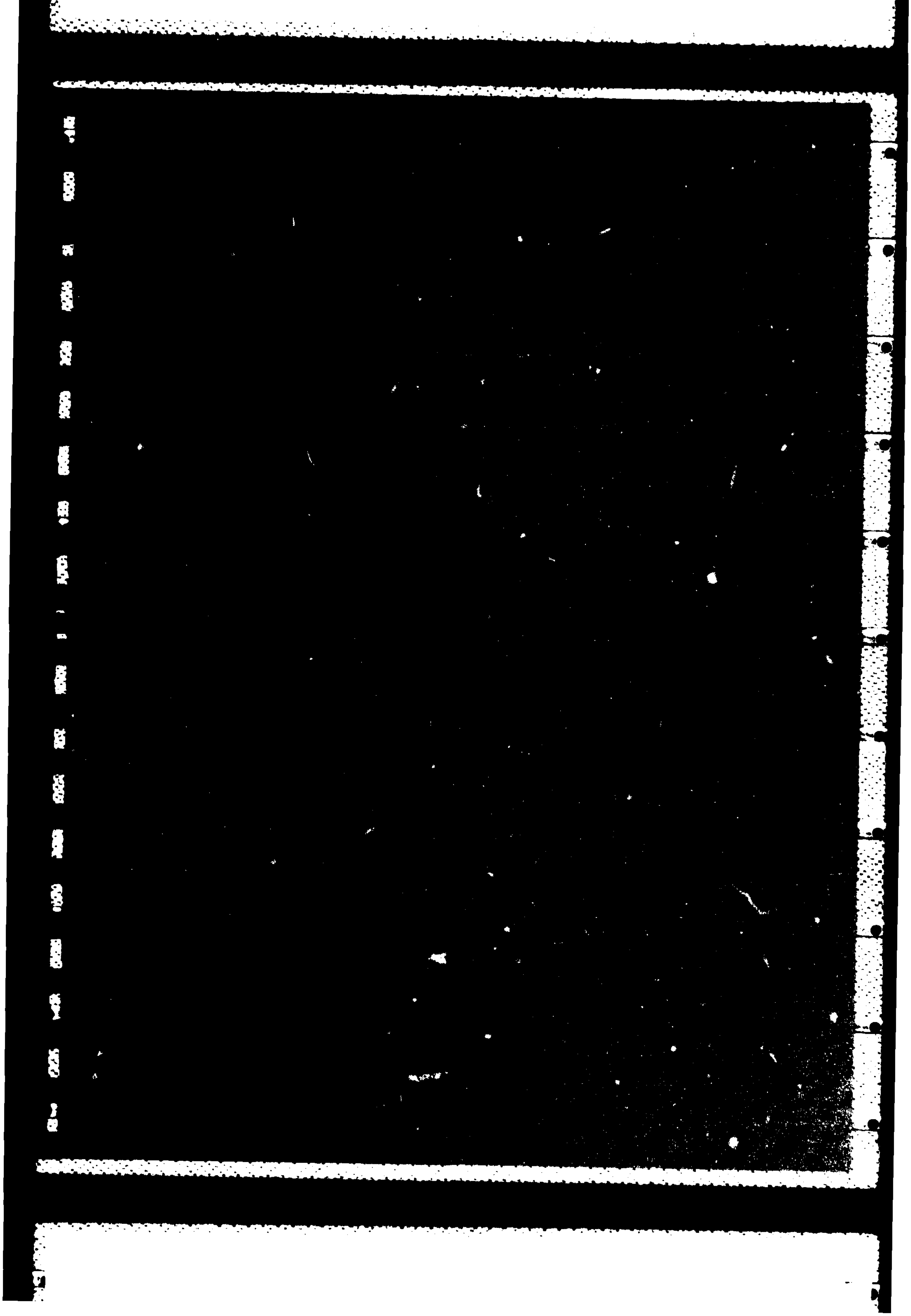

Appendix H
INVENTORY OF EXISTING POL STORAGE
TANKS AT MOUNTAIN HOME AFB

Facility/ Location	Type POL	Number of Tanks	Capacity, each (gal)	Aboveground (AG) Belowground (BG)
40	Diesel	1	500	BG
42	Diesel	1	500	BG
44	Diesel	1	500	BG
46	Diesel	1	500	BG
100	MOGAS	1	1,000	BG
110	Diesel	1	1,000	BG
151	Diesel	1	2,500	AG
153	Diesel	1	2,500	AG
224	Diesel	1	1,000	BG
261	Diesel	1	250	AG
262	Diesel	1	375	BG
264	Diesel	1	1,000	BG
265	JP-4	1	48,423	BG
	JP-4	1	48,075	BG
	JP-4	1	48,531	BG
268	JP-4	1	15,000	BG
291	Diesel	1	5,000	BG
	Diesel	1	1,000	BG
425	Diesel	2	1,000	BG
	Diesel	1	500	BG
604	Diesel	1	1,000	BG
610	Diesel	1	350	BG
900	Diesel	1	1,000	BG
1100	Waste motor oil	1	1,000	BG
1203	Diesel	1	1,000	BG
1207	Diesel	1	1,000	BG
1208	Diesel	3	1,000	BG
1209	Diesel	3	1,000	BG
1113	MOGAS	1	11,700	BG
	MOGAS	1	18,122	BG
1212	Diesel	2	285	AG
1313	Diesel	1	1,000	AG
1316	JP-4	1	1,498,982	AG
1315	JP-4	1	1,498,603	AG
	JP-4	1	1,498,325	AG
1308	Waste solvents	1	12,000	BG
	Waste synthetic oils	1	12,000	BG
	Waste motor oils	1	12,000	BG
	Waste misc. fuels & petroleum products	1	12,000	BG

Appendix H--Continued

Facility/ Location	Type POL	Number of Tanks	Capacity, each (gal)	Aboveground (AG) Belowground (BG)
1309	AVGAS	1	20,887	AG
	AVGAS	1	20,995	AG
	AVGAS	1	20,694	AG
	MOGAS	1	14,955	AG
1313	Diesel	1	1,000	AG
1320	Diesel	1	265	AG
1322	Diesel	1	1,000	AG
	Diesel	1	285	BG
1324	Deicing fluid	1	55,000	AG
1326	Diesel	1	609,983	AG
1351	Diesel	1	1,000	AG
	Diesel	1	500	AG
1352	Diesel	1	1,000	AG
	Diesel	1	500	AG
1353	Diesel	1	1,000	AG
	Diesel	1	500	AG
1354	Diesel	1	2,500	AG
	Diesel	1	1,000	BG
	Diesel	1	500	AG
1359	JP-4	1	5,000	AG
	MOGAS	1	2,000	AG
1402	Diesel	1	500	BG
1403	MOGAS	1	285	AG
1409	MOGAS	1	250	AG
1506	Diesel	1	1,000	AG
1804	Diesel	1	1,000	AG
1806	Diesel	1	285	AG
1807	Diesel	1	1,000	BG
1902	Diesel	1	1,000	AG
2201	Diesel	1	285	AG
	Diesel	1	1,000	AG
2202	Diesel	1	1,000	BG
2206	Diesel	1	2,000	BG
2207	Diesel	1	1,000	BG
2209	Waste motor oil	1	500	BG
2303	Diesel	1	1,000	BG
2304	Diesel	1	1,000	BG
2321	Diesel	1	500	AG
	Diesel	1	1,000	BG
	Diesel	1	1,000	BG
2322	Diesel	1	500	BG
	Diesel	1	500	BG
	Diesel	1	500	BG
2805	Diesel	1	1,500	BG
2806	Diesel	1	1,500	BG
3015	Diesel	1	5,000	BG
3016	Diesel	1	1,000	BG

Appendix H--Continued

Facility/ Location	Type POL	Number of Tanks	Capacity, each (gal)	Aboveground (AG) Belowground (BG)
3018	Diesel	1	285	BG
3020	Diesel	1	1,500	BG
	Diesel	1	1,000	BG
3022	Diesel	1	1,000	BG
3504	MOGAS	1	250	AG
3506	Diesel	1	27	BG
3510	Diesel	1	500	BG
3522	Diesel	1	675	BG
3523	Diesel	1	280	BG
3535	Diesel	1	300	BG
3525	Diesel	1	300	BG
4109	Diesel	1	500	BG
4200	Diesel	1	1,000	BG
4251	Diesel	1	285	BG
4401	Diesel	1	1,000	BG
4403	Diesel	2	--	--
4401-4106	Diesel	6	500 ea	BG
4400-4700	Diesel	437	500 ea	BG
4201-4300	Diesel	495	285 ea	AG
31074	Diesel	1	2,500	AG
31075	Diesel	1	2,500	AG

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Appendix I
INACTIVE POL STORAGE TANK SUMMARY[a]

Vicinity, Facility No.	Type POL Previously Stored	Number of Tanks	Capacity per Tank (gal)	Type Tank
1333	Fuel oil	1	2,500	Belowground
800	Fuel oil	2	1,000	Belowground
1209	Fuel oil	1	1,000	Belowground
211	MOGAS, AVGAS	2	5,000	Belowground
1307	1065 lubricating oil	4	15,000	Belowground

Note: Tanks have been reportedly capped off but may still contain POL products.

[a]Based on best recollection of interviewees

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HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Lagoon Landfill (Site No. 1)

LOCATION: Mountain Home AFB

DATE OF OPERATION OR OCCURRENCE: 1952 - 1956

OWNER/OPERATOR: Mountain Home AFB

COMMENTS/DESCRIPTION: Main Base Landfill after reactivation of the base in early 1950.

SITE RATED BY: Norm Hatch

Note: Site No. 1 is also the location of existing wastewater treatment lagoons 2 and 3.

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	1	10	10	30
C.	Land use/zoning within 1 mile radius	1	3	3	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	82	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 46

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.8 = 6.4

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore ___

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	46	108
Subscore (100 x factor score subtotal/maximum score subtotal)				43
2. Flooding	3	1	3	100
	Subscore (100 x factor score/3)			100
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	3	8	24	24
Direct access to ground water	1	8	8	24
		Subtotals	56	114
Subscore (100 x factor score subtotal/maximum score subtotal)				49

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 100

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	46
Waste Characteristics	64
Pathways	100
Total 210 divided by 3 =	70
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

70 x 1.0 = 70

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: B Street Landfill (Site No. 2)

LOCATION: Mountain Home AFB

DATE OF OPERATION OR OCCURRENCE: 1956 - 1969

OWNER/OPERATOR: Mountain Home AFB

COMMENTS/DESCRIPTION: Main Base Landfill from 1956 - 1969.

SITE RATED BY: Norm Hatch

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	1	3	3	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	102	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 57

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 1.0 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	___
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding		1		
	Subscore (100 x factor score/3)			___
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	24
		Subtotals	32	114
Subscore (100 x factor score subtotal/maximum score subtotal)				28

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	57
Waste Characteristics	80
Pathways	35
Total 172 divided by 3 =	57
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

57 x 1.0 = 57

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Existing Landfill (Site No. 3)

LOCATION: Mountain Home AFB

DATE OF OPERATION OR OCCURRENCE: 1969 - Present

OWNER/OPERATOR: Mountain Home AFB

COMMENTS/DESCRIPTION: Main Base Landfill 1969

SITE RATED BY: Norm Hatch

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	1	3	3	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	92	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 51

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	—
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	1	8	8	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	6	24
		Subtotals	30	108
Subscore (100 x factor score subtotal/maximum score subtotal)				28
2. Flooding		1		
	Subscore (100 x factor score/3)			
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	2	8	16	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	24
		Subtotals	32	114
Subscore (100 x factor score subtotal/maximum score subtotal)				28

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 28

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	51
Waste Characteristics	40
Pathways	28
Total 119 divided by 3 =	40
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

40 x 1 = 40

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Fire Department Training Area No. 1 (Site No. 4)

LOCATION: Mountain Home AFB

DATE OF OPERATION OR OCCURRENCE: 1943 - Present

OWNER/OPERATOR: Mountain Home AFB

COMMENTS/DESCRIPTION: Original Fire Department Training Area. Waste Fuel and Oil

SITE RATED BY: Norm Hatch

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	2	4	8	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	1	3	3	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	104	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 58

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 0.8 = 48

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

48 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore _

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	2	8	16	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108

Subscore (100 x factor score subtotal/maximum score subtotal) 35

2. Flooding 1

Subscore (100 x factor score/3)

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	0	8	0	24
Subsurface flows	0	8	0	24
Direct access to ground water	2	8	16	24
		Subtotals	24	114

Subscore (100 x factor score subtotal/maximum score subtotal) 21

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	58
Waste Characteristics	48
Pathways	35
Total 141 divided by 3 =	47
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

47 x 1.0 = 47

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Fire Department Training Area No. 2 (Site No. 5)

LOCATION: Mountain Home AFB

DATE OF OPERATION OR OCCURRENCE: 1944 - 1947

OWNER/OPERATOR: Mountain Home AFB

COMMENTS/DESCRIPTION: Second Fire Department Training Area. Waste Fuel Oil

SITE RATED BY: Norm Hatch

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	2	4	8	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	1	3	3	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	104	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 58

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 0.8 = 48

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

48 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore —

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding		1		
	Subscore (100 x factor score/3)			
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	0	8	0	24
Subsurface flows	0	8	0	24
Direct access to ground water	2	8	16	24
		Subtotals	24	114
Subscore (100 x factor score subtotal/maximum score subtotal)				21

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	58
Waste Characteristics	48
Pathways	35
Total 141 divided by 3 =	47
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

47 x 1.0 = 47

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Fire Department Training Area No. 3 (Site No. 6)

LOCATION: Mountain Home AFB

DATE OF OPERATION OR OCCURRENCE: 1947 - 1953

OWNER/OPERATOR: Mountain Home AFB

COMMENTS/DESCRIPTION: Third Fire Department Training Area. Waste Fuel and Oil

SITE RATED BY: Norm Hatch

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	2	4	8	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	1	3	3	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	94	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 0.8 = 48

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

48 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding		1		
		Subscore (100 x factor score/3)		
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	0	8	0	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	24
		Subtotals	16	114
Subscore (100 x factor score subtotal/maximum score subtotal)				14

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	48
Pathways	35
Total 135 divided by 3 =	45
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

45 x 1.0 = 45

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Fire Department Training Area No. 4 (Site No. 7)

LOCATION: Mountain Home AFB

DATE OF OPERATION OR OCCURRENCE: 1953 - 1962

OWNER/OPERATOR: Mountain Home AFB

COMMENTS/DESCRIPTION: Fourth Fire Department Training Area. Waste Fuel, Oil, and Solvents

SITE RATED BY: Norm Hatch

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	1	3	3	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	86	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 48

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.8 = 64

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	1	8	8	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	30	108

Subscore (100 x factor score subtotal/maximum score subtotal) 28

2. Flooding 1

Subscore (100 x factor score/3)

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	0	8	0	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	24
		Subtotals	16	114

Subscore (100 x factor score subtotal/maximum score subtotal) 14

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 28

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	48
Waste Characteristics	64
Pathways	28
Total 140 divided by 3 =	47
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

47 x 1.0 = 47

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Existing Fire Department Training Area (Site No. 8)

LOCATION: Mountain Home AFB

DATE OF OPERATION OR OCCURRENCE: 1962 - Present

OWNER/OPERATOR: Mountain Home AFB

COMMENTS/DESCRIPTION: JP4 fuel has been used exclusively since 1975.

SITE RATED BY: Norm Hatch

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	1	3	3	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	100	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 56

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.8 = 64

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore —

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	46	108

Subscore (100 x factor score subtotal/maximum score subtotal) 43

2. Flooding 1

Subscore (100 x factor score/3)

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	0	8	0	24
Subsurface flows	0	8	0	24
Direct access to ground water	2	8	16	24
		Subtotals	24	114

Subscore (100 x factor score subtotal/maximum score subtotal) 21

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 43

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	56
Waste Characteristics	64
Pathways	43
Total 163 divided by 3 =	54
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

54 x 1.0 = 54

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Wastae Oil Disposal Site (Site No. 9)

LOCATION: Mountain Home AFB

DATE OF OPERATION OR OCCURRENCE: 1953 - 1956

OWNER/OPERATOR: Mountain Home AFB

COMMENTS/DESCRIPTION:
Waste oil poured into natural depression

SITE RATED BY: Norm Hatch

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	1	3	3	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	92	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 51

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.8 = 64

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	1	8	8	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	6	24
		Subtotals	30	108
Subscore (100 x factor score subtotal/maximum score subtotal)				28
2. Flooding		1		
	Subscore (100 x factor score/3)			
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	0	8	0	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	24
		Subtotals	16	114
Subscore (100 x factor score subtotal/maximum score subtotal)				14

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 28

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	51
Waste Characteristics	64
Pathways	28
Total 143 divided by 3 =	48
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

48 x 1.0 = 48

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Perimeter Road (Site No. 10)

LOCATION: Mountain Home AFB

DATE OF OPERATION OR OCCURRENCE: 1950's to 1975

OWNER/OPERATOR: Mountain Home AFB

COMMENTS/DESCRIPTION: Road oiling using waste POL

SITE RATED BY: North Hatch

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	1	10	10	30
C.	Land use/zoning within 1 mile radius	1	3	3	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	82	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 46

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 0.8 = 64

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

64 x 1.0 = 64

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore —

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
1. Surface-water migration				
Distance to nearest surface water	2	8	16	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	38	108
Subscore (100 x factor score subtotal/maximum score subtotal)				35
2. Flooding		1		
	Subscore (100 x factor score/3)			
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	0	8	0	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	24
		Subtotals	16	114
Subscore (100 x factor score subtotal/maximum score subtotal)				14

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 35

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	46
Waste Characteristics	64
Pathways	35
Total 145 divided by 3 =	48
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

48 x 1.0 = 48

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Fuel Hydrant System Leak/Spill Area (Site No. 11)

LOCATION: Mountain Home AFB

DATE OF OPERATION OR OCCURRENCE: ~ 1958

OWNER/OPERATOR: Mountain Home AFB

COMMENTS/DESCRIPTION: Fuel line leak; defuel tank spill

SITE RATED BY: Norm Hatch

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	1	3	3	9
D.	Distance to reservation boundary	1	6	6	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	1	6	6	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	94	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 100

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

100 x 0.8 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	46	108

Subscore (100 x factor score subtotal/maximum score subtotal) 43

2. Flooding 1

Subscore (100 x factor score/3)

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	0	8	0	24
Subsurface flows	0	8	0	24
Direct access to ground water	2	8	16	24
		Subtotals		114

Subscore (100 x factor score subtotal/maximum score subtotal) 14

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 43

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	80
Pathways	43
Total 175 divided by 3 =	58
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

58 x 1.0 = 58

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: Entomology Shop Yard (Site No. 12)

LOCATION: Mountain Home AFB

DATE OF OPERATION OR OCCURRENCE: 1970's

OWNER/OPERATOR: Mountain Home AFB

COMMENTS/DESCRIPTION: Soil sampling shows presence of pesticides

SITE RATED BY: Norm Hatch

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site	2	4	8	12
B. Distance to nearest well	3	10	30	30
C. Land use/zoning within 1 mile radius	1	3	3	9
D. Distance to reservation boundary	1	6	6	18
E. Critical environments within 1 mile radius of site	0	10	0	30
F. Water quality of nearest surface-water body	1	6	6	18
G. Ground-water use of uppermost aquifer	3	9	27	27
H. Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I. Population served by ground-water supply within 3 miles of site	3	6	18	18
		Subtotals	98	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 54

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 1.0 = 60

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

60 x 1.0 = 60

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore

B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	1	8	8	24
		Subtotals	46	108

Subscore (100 x factor score subtotal/maximum score subtotal) 43

2. Flooding 1

Subscore (100 x factor score/3)

3. Ground-water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	0	8	0	24
Subsurface flows	0	8	0	24
Direct access to ground water	2	8	16	24
		Subtotals	24	114

Subscore (100 x factor score subtotal/maximum score subtotal) 21

C. Highes pathway subscore

Enter the highest subscore value from A, B-1, B-2, or B-3 above.

Pathways Subscore 43

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	54
Waste Characteristics	60
Pathways	43
Total 157 divided by 3 =	52
	Gross Total Scor

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

52 x 1.0 = 52

Appendix K
GUIDELINES FOR A LIMITED PHASE II MONITORING PROGRAM FOR MOUNTAIN HOME AFB

I. INTRODUCTION

The Phase II Installation Restoration Program will generate the field data needed to confirm or rule out the existence of hazardous contaminant migration at the indentified sites. If appropriate, these data will be used in developing conceptual engineering remedial action alternatives.

The field confirmation studies may consist of two subphases: the initial field investigation and the follow on investigation. The initial field investigation includes those minimal surveys considered necessary to define the nature of the problem and determine the presence of contamination or contaminant migration at the site. If the initial investigation determines that there is no evidence of contamination, the site will be dropped from further study or deferred to long-term monitoring. If the initial investigation determines that there is indeed contamination, a decision will be made whether or not to conduct a follow on investigation, based on considerations of the environmental setting, the reliability of the data, and the remedial action alternatives. Thus, remedial actions, if necessary, can be evaluated and costed at an appropriate IRP phase. In some cases conceptual engineering evaluations can be conducted following initial field investigations. In other cases, detailed information on contaminant extent, rates of migration, fluctuation, and concentration may be advisable before an appropriate evaluation of remedial actions can be undertaken. Remedial actions may include monitoring, containment, removal, or treatment.

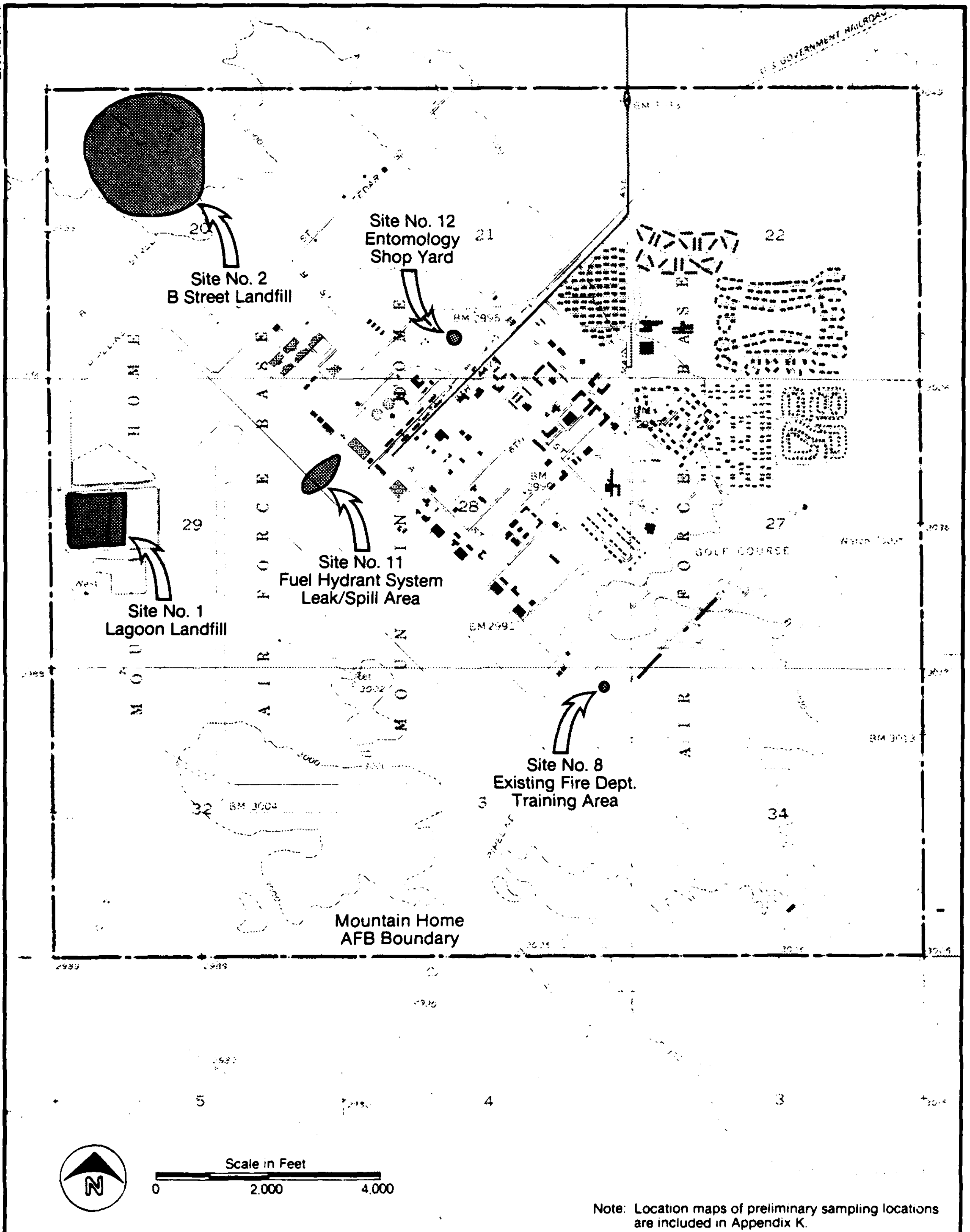
Figure 23 shows the sites where Phase II monitoring is recommended.

II. SAMPLING LOCATIONS, ANALYSES, AND DATA EVALUATION

Sampling is recommended for the Lagoon Landfill (Site No. 1), the B Street Landfill (Site No. 2), the Existing Fire Department Training Area (Site No. 8), the Fuel Hydrant System Leak/Spill Area (Site No. 11), and the Entomology Shop Yard (Site No. 12). Preliminary sampling locations are shown on Figures 24, 25, 26, 27, and 28. Final sampling point selection should be done by the Phase II contractor after a preliminary site visit. The purpose of the preliminary site visit will be to:

- Establish base contact
- Observe and record site features
- Establish approximate areal limits of the sites
- Locate utilities present at sites, if any
- Identify any unusual or potentially hazardous conditions, if any, that could impact well installation or sampling programs
- Select the final sampling locations

The analyses suggested for the limited Phase II program have been described previously in Section VI, "Recommendations," Table 10. The monitoring well samples for Sites No. 1 and 2, and the surface water and sediment samples for Site No. 1, should be collected on two occasions at least 30 days apart. The soil samples for Sites No. 8, 11, and 12 should be collected once; while the drainage ditch water



Note: Location maps of preliminary sampling locations are included in Appendix K.

FIGURE 23.
Location Map of Sites Recommended for Limited Phase II Monitoring.

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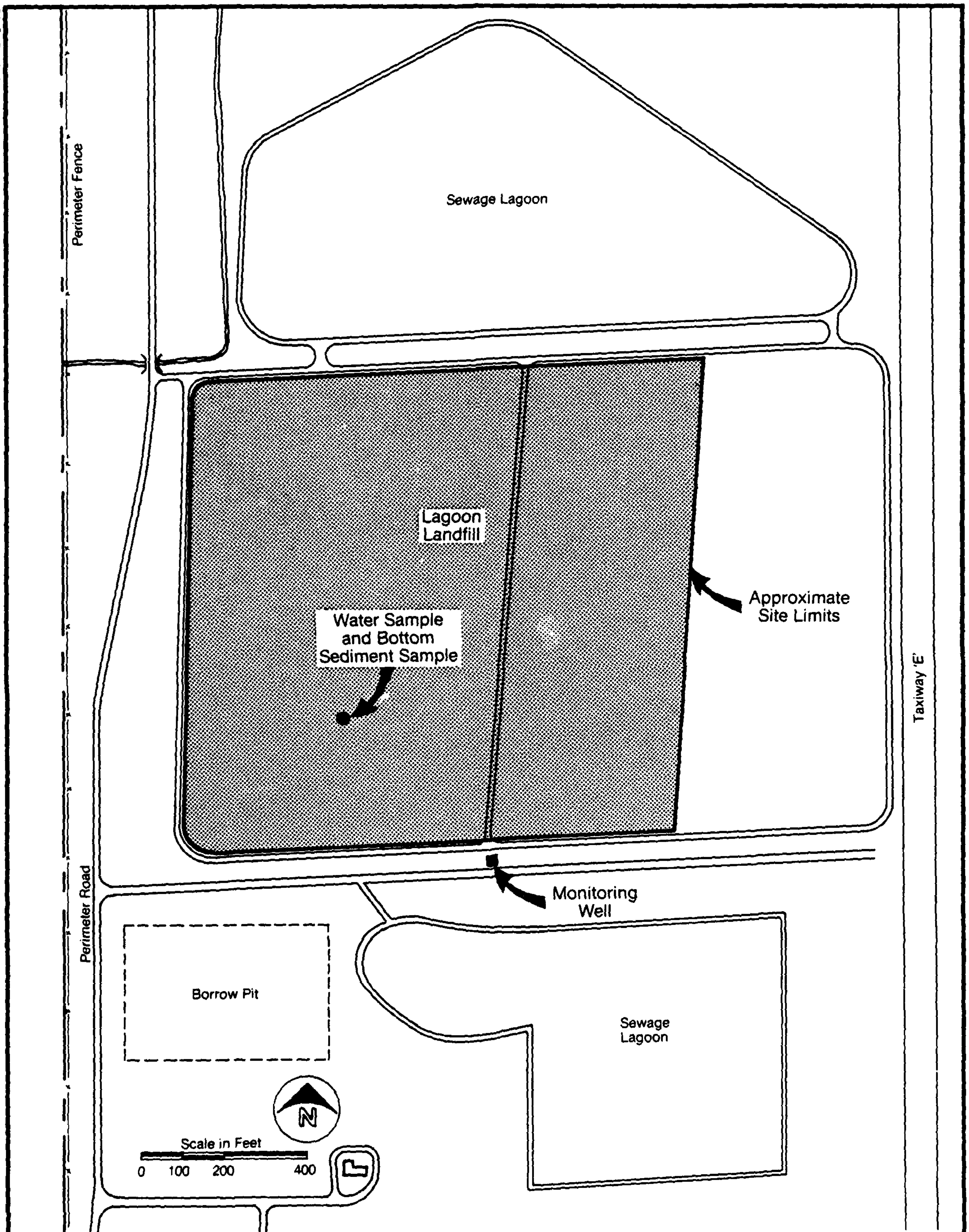

FIGURE 24.
Preliminary Sampling Locations for Site No. 1—
Lagoon Landfill.

CH2M HILL

GN14649.V0

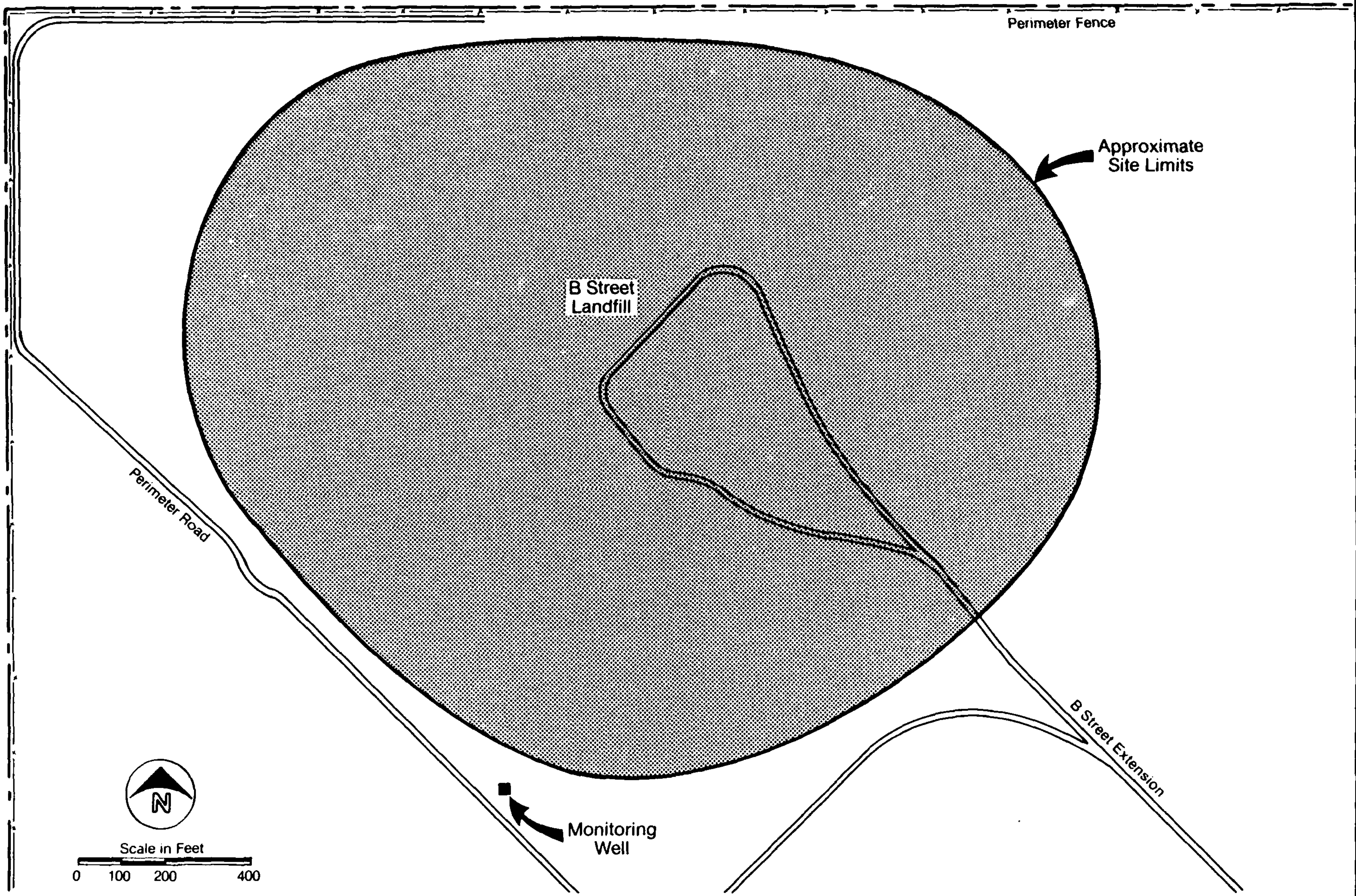

FIGURE 25.
Preliminary Sampling Locations for Site No. 2—
B Street Landfill.

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GN14649 V0

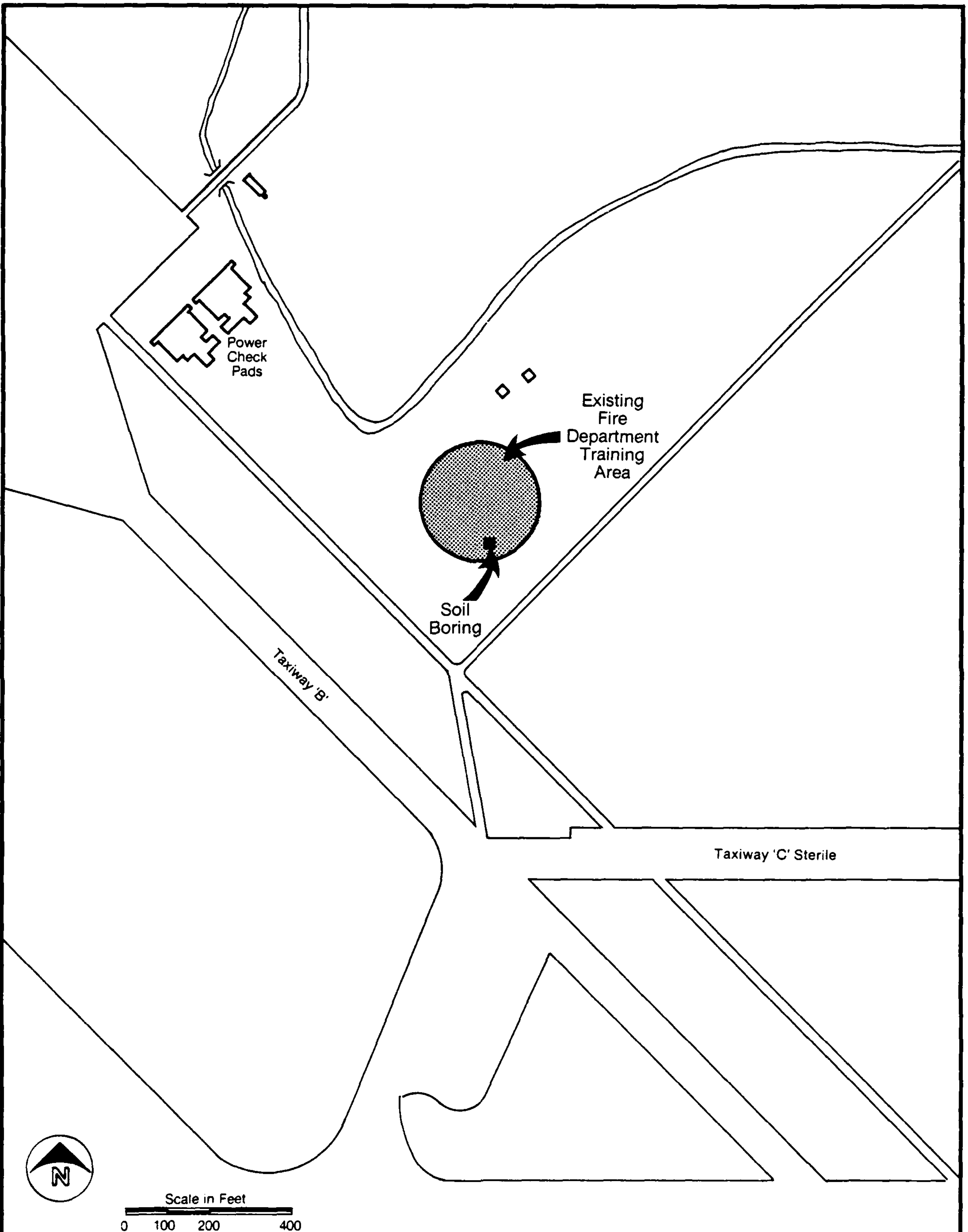

FIGURE 26.
Preliminary Sampling Locations for Site No. 8—
Existing Fire Department Training Area.

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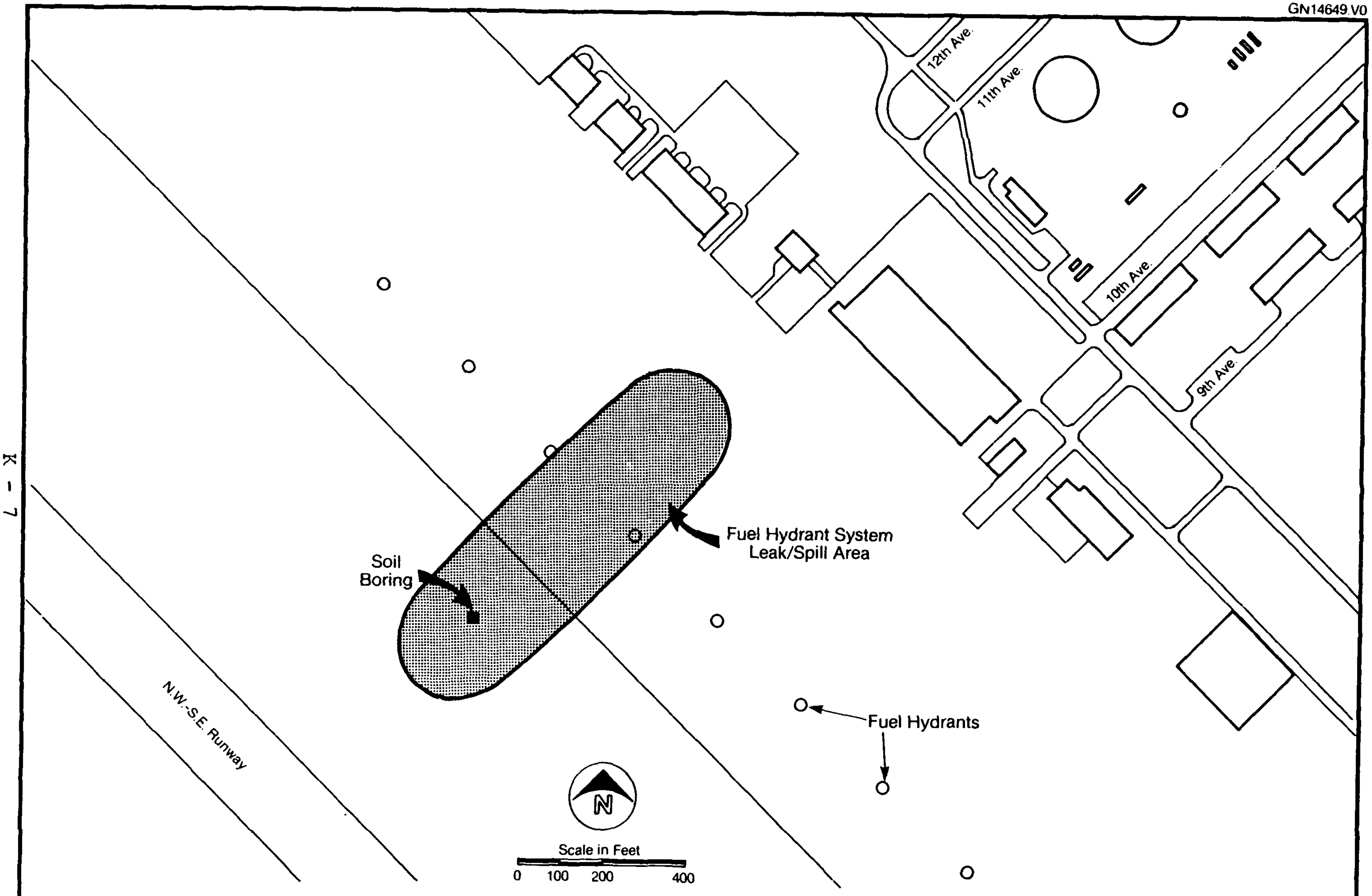

FIGURE 27.
Preliminary Sampling Location for Site No. 11—
Fuel Hydrant System Leak/Spill Area.

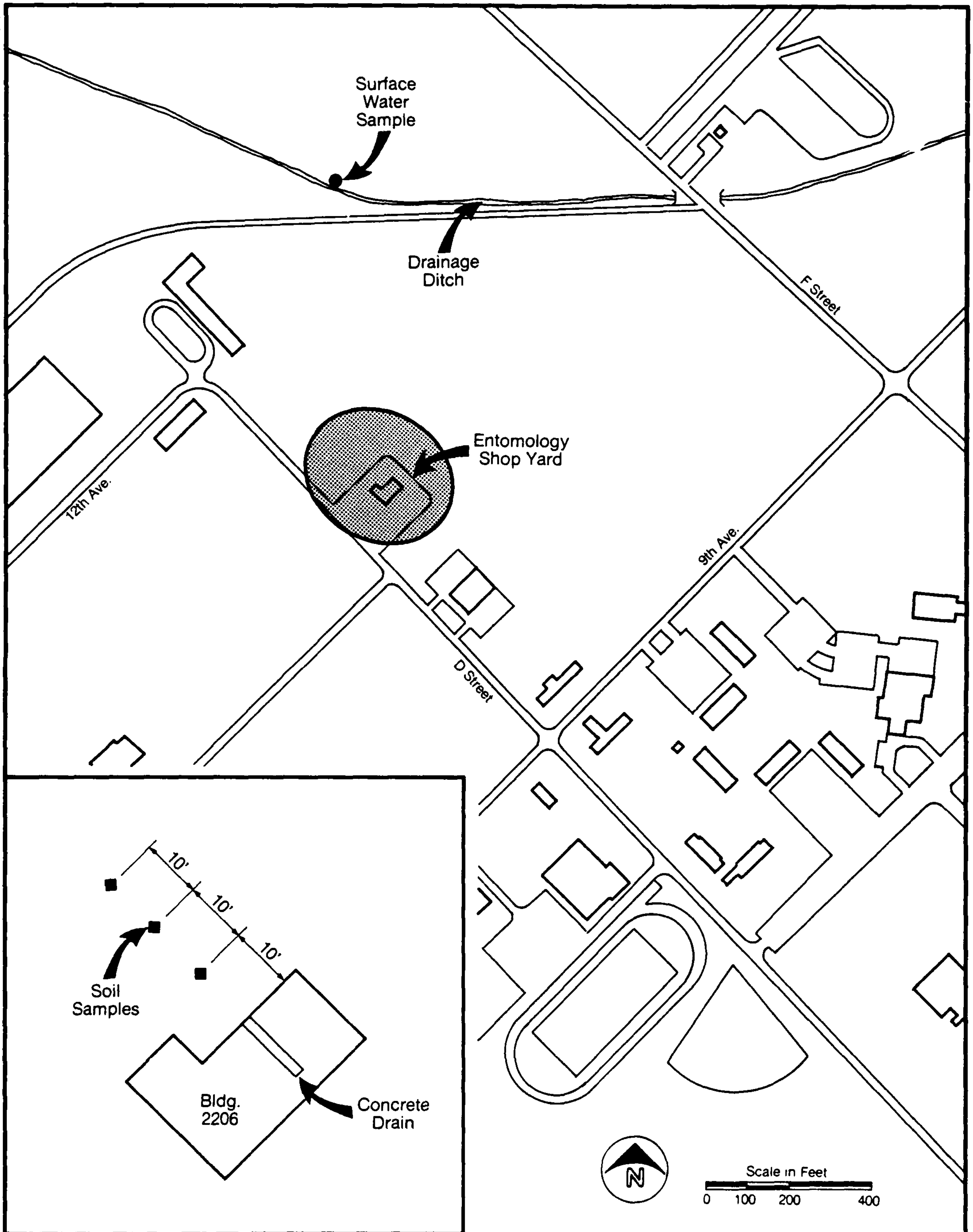

FIGURE 28.
Preliminary Sampling Locations for Site No. 12—
Entomology Shop Yard.

CH2M HILL

sample for Site No. 12 should be collected once after a rainfall event when water is flowing in the ditch. As much as possible, the sampling at Sites No. 8, 11, and 12 should coincide with one of the sampling episodes for Sites No. 1 and 2.

The data collected should be evaluated in terms of applicable ground and surface water quality criteria. If water quality standards or criteria are not available for some of the parameters, then it is suggested that available toxicological information be used.

For Sites No. 1 and 2, three general cases are possible:

Case 1: Both samples indicate pollutants are not present or are present at levels below the recommended water quality standards or criteria or below recommended levels based on toxicological information.

Case 2: Both samples indicate pollutants are present and at levels higher than the recommended water quality standards or criteria or the recommended levels based on toxicological information.

Case 3: One of the two samples shows the presence of pollutants at levels higher than the recommended water quality standards or criteria or the recommended levels based on toxicological information.

Suggested actions for dealing with each case are given below:

Case 1 Action--If none of the analyzed pollutants are detected, delete the study site from further consideration. If one or more pollutants are detected but at levels lower than the recommended levels, then based upon an evaluation of the number, type, and concentrations of pollutants found, consideration should be given to continued monitoring or deleting the site from further action.

Case 2 Action--Develop a program to determine the extent of contaminant migration. As a minimum, the following would be applicable at both study sites:

- Confirm ground-water flow direction.

- Establish background ground-water quality.

- Define local extent of leachate plume.

- Define the rock profile, soil material types, and distribution.

- Obtain any additional information deemed necessary by the contractor to develop conceptual remedial action alternatives.

Case 3 Action--Collect a third sample at least 30 days after the second sample was collected. This additional sampling is recommended as a precaution to ensure that significant contaminant migration is not occurring from the site. If the third sample shows the presence of contaminants in excess of the recommended levels, follow Case 2 action. If the sample shows no contaminants present or at levels below the recommended levels, follow Case 1 action.

For Sites No. 8 and 11, three general cases are possible:

<u>Case 1</u>: The samples indicate that pollutants are not present or are present at low levels.

<u>Case 2</u>: The samples indicate that pollutants are present at high levels above and below the hardpan layer.

<u>Case 3</u>: The samples indicate that pollutants are present at high levels above the hardpan layer, but are not present or are present at low levels below the hardpan layer.

Suggested actions for dealing with each case are given below:

<u>Case 1 Action</u>--If none of the analyzed pollutants are detected, delete the study site from further consideration. If one or more pollutants are detected but at low levels, then based upon an evaluation of the number, type, and concentration of pollutants found, consideration should be given to continued monitoring or deleting the site from further action.

<u>Case 2 Action</u>--Develop a program to determine the extent of contaminant migration. As a minimum, the following would be applicable at both study sites:

- Define vertical extent of contaminant migration, e.g., deeper soil borings.

- Define the areal extent of contaminant migration with more sampling locations.

- Define the necessity of monitoring well installation based on an evaluation of the data obtained from the additional soil borings.

<u>Case 3 Action</u>--Collect an additional soil boring to confirm that pollutants are not present at high levels below the hardpan layer. The additional soil borings should be conducted at a different location, but close to (within 10 ft) of the original sampling location. This additional sampling is recommended as a precautionary measure to ensure that contaminants have not migrated below the hardpan layer. If the additional boring shows the presence of pollutants below the hardpan layer, follow Case 2 action; if not, follow Case 1 action.

For Site No. 12, three general cases are possible:

<u>Case 1</u>: All soil samples indicate that pollutants are not present, or are present at low levels.

<u>Case 2</u>: Soil samples indicate that pollutants are present at high levels at and below the ground surface.

<u>Case 3</u>: Soil samples indicate that pollutants are present at high levels at the ground surface, but are not present or are present at low levels below the ground surface.

Suggested action for dealing with each case is given below:

<u>Case 1 Action</u>--Consider the same Case 1 action as for Sites No. 1, 2, 8, and 11.

<u>Case 2 Action</u>--Develop a program to determine the extent of contaminant migration. As a minimum, the following would be applicable:

- o Define the vertical extent of the contaminant migration with deeper soil sampling. Determine if pollutants have migrated beneath the hardpan layer.

- o Define the areal extent of contaminant migration with more sampling locations.

- o Define the necessity of monitoring well installation based on an evaluation of the data obtained from the additional soil sampling.

- o Determine the potential for surface water contamination by collecting additional samples from the nearby drainage ditch.

<u>Case 3 Action</u>--Collect additional soil samples to confirm that pollutants are not present below the ground surface. Collect additional samples from the nearby drainage ditch to determine if surface water contamination is taking place from high pollutant levels at the ground surface. The additional samples should be collected at different locations, but close to (within 10 ft) of the original sampling locations. This additional sampling is recommended as a precaution to ensure that significant contaminant migration is not occurring from the site. If additional samples show the presence of pollutants at high levels below the ground surface or pollutant migration to the drainage ditch, follow Case 2 action; if not, follow Case 1 action.

III. MONITORING WELL INSTALLATION

Construction of monitoring wells during either the initial field confirmation investigation or the follow on investigation should proceed according to the procedures described in this appendix. A qualified and experienced geologist or geotechnical engineer should be present with each rig throughout the well drilling to direct progress of the work, log all soil samples, record all pertinent observations, and label all samples. This field representative should also direct the development of the wells and conduct the field permeability tests (aquifer tests).

Soil Sampling and Logging

A soil boring should be made at each proposed monitoring well location prior to installation of the well casing. The results of the soil boring will be used to confirm the anticipated soil stratification, permeabilities, bedrock depth and type, and ground-water table. Details of the monitoring well construction may be adjusted appropriately based on these findings, including screened interval, depth of well, gravel-pack gradation, screen slot size, or installation/development methodology. In addition, soil samples will be obtained which may be used to confirm anticipated soil properties such as gradation, plasticity, or permeability by performing appropriate laboratory tests.

The soil borings should be made using a 4- to 6-inch nominal diameter hollow-stem auger. Disturbed soil samples are to be taken at 5-foot intervals and at other intermediate depths as may be required to adequately describe the subsurface conditions in the judgment of the field representative. Samples may be obtained by using either a

2-inch outside diameter split-spoon sampler or a 3-inch outside diameter thin-walled Shelby tube. After sampling has been completed, the soil borings should be properly sealed to prevent a pathway for contaminant migration.

The soils encountered should be classified by the field representative in accordance with the Unified Soil Classification System (ASTM D2488) and in accordance with any specific DoD requirements. The soil description should include the soil name, gradation or plasticity, estimated particle-size distribution, color, moisture content, relative density or consistency, soil structure or minerology, local or geologic name, and the USGS group symbol. Any abnormal behavior encountered during the drilling operations should be noted, such as changes in drilling rates or stratification.

Well Installation

The recommended construction of each well is shown schematically on Figure 29 (page K-16). In general, the well at Sites No. 1 and 2 should be installed so that the slotted section of the well is located between a depth of 390 to 450 feet below the ground surface, within the Bruneau Formation. Final depth of the well is expected to vary between 440 and 460 feet.

The wells should be drilled using mud-rotary drilling methods by drilling an 8-inch-diameter hole to total depth. Well casings should consist of 4-inch-diameter Schedule 40 PVC pipe with threaded (screw-type) joints; no adhesive compounds should be used. The well screen will vary in length, depending on the total depth of the well. The screen should consist of factory-fabricated slots between .01 and .04 inches wide.

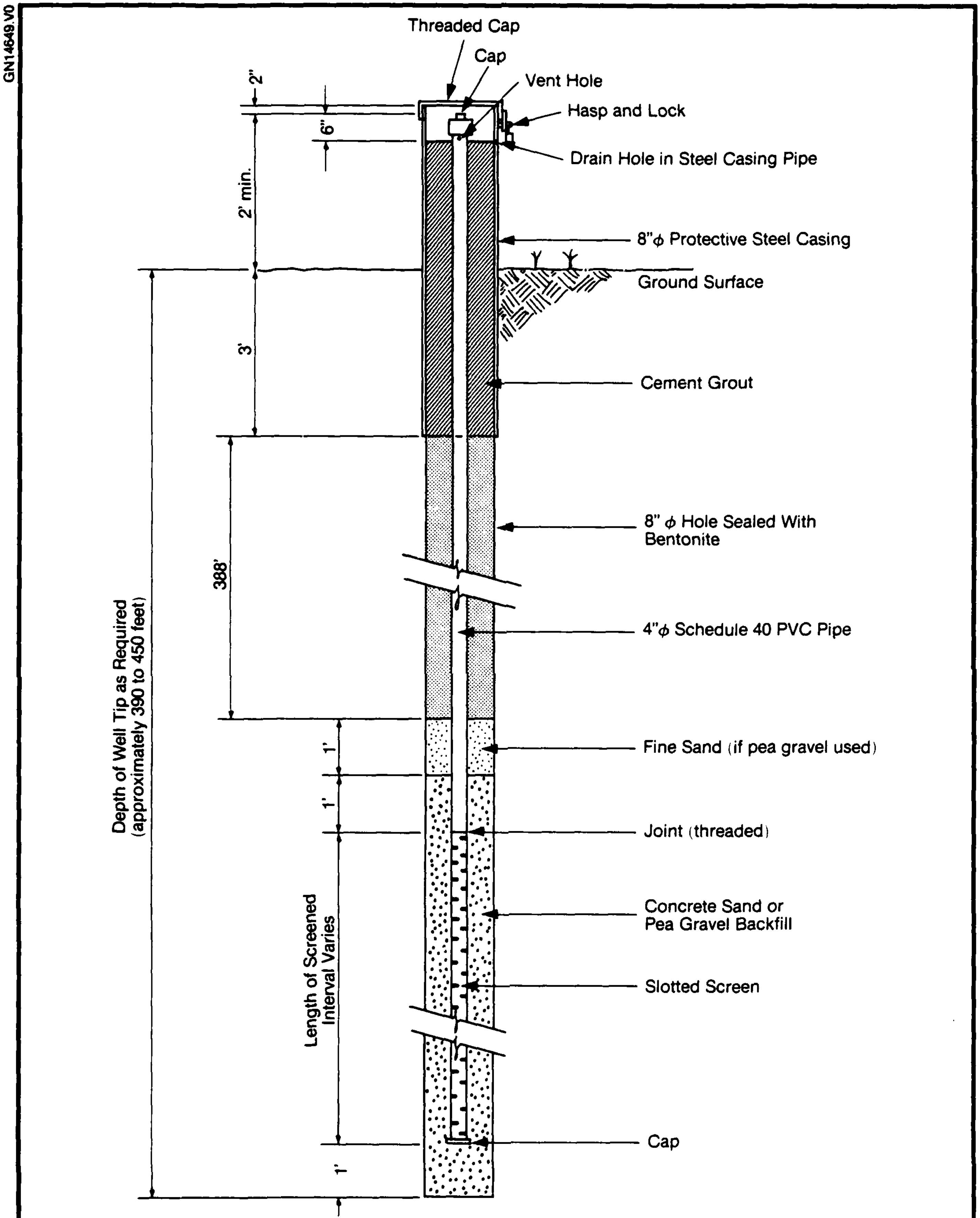

FIGURE 29.
Typical Monitoring Well Installation.

The well casing and screen should be positioned inside the 8-inch hole. A washed, medium-grained sand, similar to concrete sand (ASTM C33) should then be placed around the screen and the hole. The Phase II contractor should be responsible for selecting the exact slot size and backfill gradation for the well.

Above the sand or gravel backfill, a 3-foot interval of bentonite clay pellets should be used to seal the well. Neat cement grout, consisting of about 7 gallons of water per 94-pound bag of Portland cement, should be used to fill the annulus above the bentonite at the ground surface.

Each well casing should rise about 2 feet above the ground surface and should be capped with an unthreaded, removable PVC cap. A 8-inch diameter steel casing should be placed over the casing and embedded at least 3 feet. A threaded cap should be placed on top of the iron pipe, with a hasp and key-lock padlock to secure the well.

<u>Well Development</u>

Once a well has been completed, it should be developed by bailing the hole a minimum of 5 times its volume below the water table, or until the resulting water is, in the opinion of the field inspector, sufficiently clear to ensure proper functioning of the developed well. Methods of well development that cause reversals of flow, or surging, through the screen may be used. Static water levels should be measured and recorded both prior to and at least 24 hours following well development.

Aquifer tests consisting of rising head field permeability tests should be performed in each completed and developed well.

Well Survey

Each monitoring well should be surveyed to establish horizontal control within about 3 feet; these locations should be shown on existing installation maps. Vertical control should be established within about 0.1 foot with respect to USGS datum (mean sea level) for the ground surface and the top of each PVC well casing.

IV. SAMPLING PROTOCOL GUIDELINES

A sampling protocol is a plan that addresses the steps necessary to ensure the technical adequacy and validity of a sampling and analysis program. A sampling program should address the following items:

- Sample bottle preparation
- Sampling procedure
- Sample preservation and holding times
- Sample shipping
- Record keeping
- Analytical procedures
- Quality assurance

Sample Bottle Preparation

Sample bottle preparation includes selecting the type and size container and the proper cleaning procedure to protect against sample contamination. All three items are dependent upon the parameter to be tested for. EPA-recommended procedures for sample bottle preparation should be followed.

Sampling Procedure

Specific sampling procedures must be developed. These procedures are dependent on the nature of the sampling location (i.e., well, surface stream, etc.), the size of sample required, and any special techniques necessary due to the nature of the parameter or parameters to be tested.

Sample Preservation and Holding Times

Requirements for sample preservation and holding times are specific to the parameters being tested. Typical preservation techniques may include adding a chemical preservative to the sample and keeping the sample cooled to 4°C until time for analysis. Holding times are critical. When properly preserved, some samples can be stored for days while others should be analyzed as soon as possible. EPA-recommended sample preservation procedures and holding times should be adhered to.

Sample Shipping

Sample shipping should be planned to minimize in-transit times. Proper protection should be provided to minimize the possibility of breakage or sample spoilage.

Record Keeping

Record keeping should include tagging each sample with the pertinent information such as sample number, location, time of collection, required analyses, etc. Chain-of-custody records should be maintained to provide a record of the routing of each sample and the names of the personnel receiving and handling the samples.

Analytical Procedures

The analytical procedures to be used must be standard approved methods and should be properly referenced. Any deviations from standard approved procedures should be well documented and agreed to by the proper parties in advance.

Quality Assurance

Quality assurance of analytical results should be maintained throughout a sampling program. Elements of a quality assurance program may include the periodic analysis of blank samples to determine if sample contamination is occurring. To verify the accuracy of the laboratory, samples spiked with a known quantity of the constituent to be tested should occasionally be submitted for analysis. Another technique to verify laboratory accuracy involves splitting samples between the prime lab and one or more other labs.

V. HEALTH AND SAFETY PLAN

A. The Phase II contractor must take appropriate measures to ensure the health and safety of his employees. Each of the study sites was visited by the Phase I contractor and, based on his visits, the sites do not appear to pose a significant hazard to visiting personnel. The samples that will be collected at each site are environmental water, soil, and sediment samples as opposed to "hazardous waste" samples and no need for unusual levels of personal protection are anticipated. Nonetheless, the Phase II contractor will have the final responsibility for determining the necessary health and safety measures.

B. The Phase II contractor should have health and safety plans that address, as a minimum, the following items:

- o Responsibility of employees with regard to safety
- o Pathways of personal physical exposure
- o Initial hazard assessment
- o Emergency treatment
- o Safety and protective equipment

1. <u>Employee Safety</u>

When visiting the sites, employees should use common sense, judgment, and experience. They should have reviewed in advance all existing data on the site to determine if any safety precautions are necessary.

2. <u>Pathways of Physical Exposure</u>

The Phase I study indicated that hazardous wastes may have been disposed of in the past at both sites. Because of the potential for exposure to these wastes, personnel should be aware of the pathways by which the materials can enter their body and how to prevent that entry. There are four (4) pathways:

- o Inhalation
- o Skin absorption
- o Ingestion
- o Eye contact

Inhalation is best prevented by not breathing in direct proximity to the waste or using a respirator appropriate for the type of hazardous material.

To prevent or minimize skin absorption, a combination of gloves, boots, hats, and coveralls should be worn. Although this clothing does not provide absolute protection, it should provide ample protection for personnel working at either of the sites.

To prevent ingestion, do not eat, drink, or smoke during visits to either site.

To prevent eye contact, wear safety glasses, chemical goggles, or a face shield (without side perforations); do not rub eyes; and do not wear contact lenses. (Contact lenses cannot be worn with self-contained breathing apparatus or respirators.)

3. <u>Initial Site Hazard Assessment</u>

Although the Phase I contractor has visited the sites and perceives no imminent hazard associated with these sites, the Phase II contractor should satisfy himself that hazards do not exist at the sites. He should review all available information on the sites and toxicological data on any materials suspected of being present at the sites to determine what protective clothing and equipment are required for the site visits. He should satisfy himself that fire, explosion, high levels of air contaminants, and nuclear radiation hazards are not present prior to entering either site.

4. Emergency Treatment

Before entering each site, the field team should know the locations and telephone numbers of the nearest emergency facilities (medical, fire, police, etc.). It is advisable that all field personnel have training in first aid and be prepared to provide emergency treatment for inhalation or ingestion of hazardous materials and skin exposure to or eye contact with hazardous materials.

5. Safety and Personnel Protective Equipment

For adequate protection against exposure to hazardous substances, should they be encountered at each site, it is advisable that all employees have available first aid and safety equipment, protective clothing, and respiratory equipment. As a minimum, first aid equipment should include a first aid kit and a first aid handbook. Other first aid items include a supply of clean water, a potable eyewash unit, and oxygen bottles. Safety equipment might include an explosivity meter, radiation detector, organic vapor analyzer, and a list of emergency telephone numbers.

Protective clothing that might be needed in the field includes safety glasses, goggles and/or face shield, protective boots, protective gloves, spill-resistant coveralls, or plain coveralls with chemical protective apron worn over them.

Three kinds of respiratory protection devices are available:

- Self-contained breathing apparatus (SCBA)
- Supplied air or air line respirator
- Air-purifying respirator

Determination of the proper type to use and its use requires formal training. The self-contained breathing apparatus provides the most complete breathing protection for periods of time based on the amount of breathing air supplied and the breathing demand of the wearer. Normally, protection is provided for about 20 minutes.

The supplied air device delivers air through a supply hose and is generally used for long-term entry into a hazardous area.

The air-purifying device removes contaminants from the atmosphere to some degree and can be used only in atmospheres containing sufficient oxygen to sustain life.

Should it be determined that respiratory equipment is warranted at each study site, the latter would probably be the most applicable device.

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